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Electric Furnace Operating Experiences

Experiments with Three Forms of Furnace Bottom—Methods of Building Bottoms—Experiments with Roof and Sidewalls—Metallurgical Features

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DURING the last five years the electric furnace has shown the greatest increase of its career. Under the conditions of war specifications there

was great need for a melting medium which would furnish the required steel. Many orders carried such rigid specifications that they could only be met by steel made either in the electric furnace or the crucible. Eliminating the crucible due to its small tonnage and high cost, there remained only the electric furnace. The tests of this steel, the tonnage possible in a given period, and its commercial costs, opened the eyes of manufacturers to its peace time possibilities. Its scope or adaptability in the making of alloy steels, steel castings, iron castings, etc., have come to be thoroughly recognized, and it has become one of the accepted factors in the steel industry.

Many new furnaces have come into existence and many executives have adopted the idea that all they need to produce steel of exceptional quality is an electric furnace. The personal equation is either ignored or passed over as a minor point. The following paper is an attempt to show what highly varying results can be obtained on the same furnace under different conditions of operation. The points shown are not brought forward as anything new, but merely to bring before the eyes of the electric furnace industry some points usually regarded as minor, yet points which may mean commercial success to a new undertaking.

Furnace and Equipment

The furnace discussed in the following article is a standard 6-ton Heroult, basic lined. The electrical equipment used throughout is of General Electric make.

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This furnace is working on steel castings and high-grade rolling and forging ingots for general railroad work. The scrap used is not selected, but is taken

as it comes from the road, consisting of such material as old track bolts, spikes, tie-plates, old castings, forge flashings and butts, borings and turnings, etc.

When the furnace was about to be put into operation great consideration was given as to whether an acid or a basic process was to be used. The advantages for the acid process were hotter and cheaper steel and greater tonnage in a given period. Against this were the disadvantages: selected scrap must be used to meet specifications, due to the inability to do any refining of note on an acid bottom; specifications and analyses are harder to meet with constant exactitude; alloy steels cannot be very satisfactorily made, and can never be remelted to save alloys; no iron refining can ever be done; power surges and even control give more trouble than on a basic bottom.

As the scrap to be used was high in phosphorus and sulphur, due to large quantities of wrought iron, it became imperative to use the basic process. Against the disadvantage of higher cost for this process were the ability to make any analysis with ease; great refining possibilities; easier power control; elimination of power surges with high peak loads; reclamation of alloy steel scrap; and most important of all, complete

de-gasification.

Basic Furnace Bottoms

There are three methods in use for the making up of a basic bottom.

1. The bottom is sintered in bit by bit, being always under the heat of the arc.

2. The whole bottom is rammed into place, the furnace filled with coke and heated white hot for from

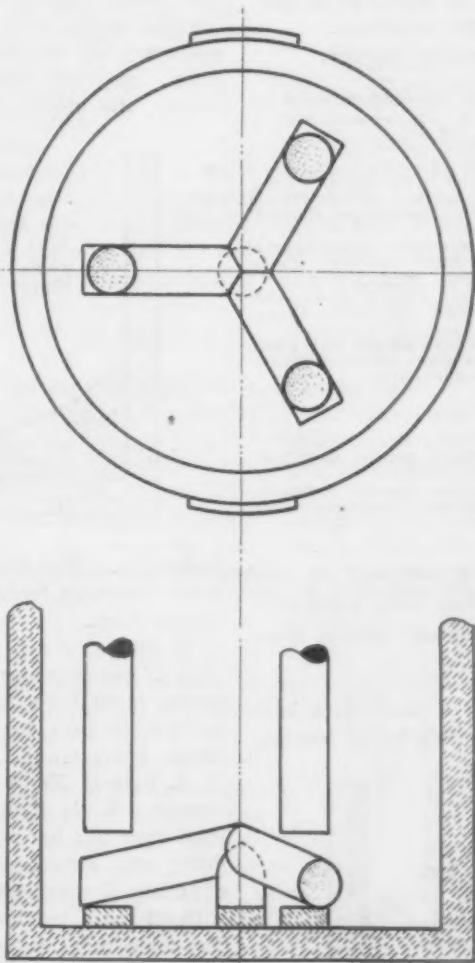
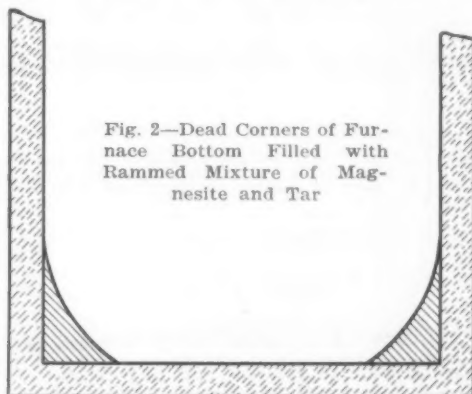


Fig. 1—Arrangement of Electrodes for Burning the Bottom of the Furnace by Sintering Bit by Bit

8 to 24 hr., burning in the complete bottom at one operation.

3. The bottom is rammed in an inch or two at a time, and then burned as in method 2.

Believing that the better the bottom at first, the less trouble in the future, we used the first method. This method is one which, if properly done, will give

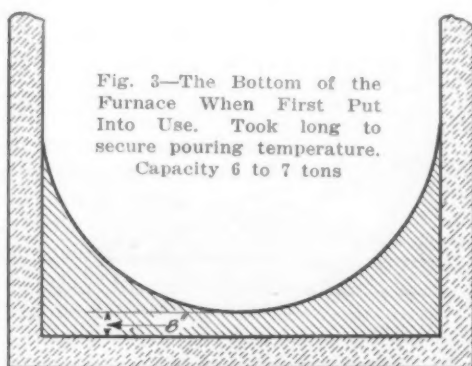


a bottom of solid material all the way through, without any foreign material such as coke from tar, as would be obtained in a rammed bottom. Then there is no danger of the bottom rising in layers as is possible when put in by ramming a layer at a time.

The following is a log of the bottom burning:

Electrodes set on bottom as shown in Fig. 1.
Dead corners of bottom filled with rammed mixture of magnesite and tar, as shown in Fig. 2.
4:30 p. m. Current on at 2000 amp.; 500 kw.
5:30 p. m. Current 3000 amp.; 700 kw.
6:30 p. m. Current 4000 amp.; 900 kw.
7:30 p. m. Opened doors for first time after start, raised electrodes and inspected walls. On lowering electrodes the plug in bottom connection slipped.
8:05 p. m. Current on again at 900 kw.
9:45 p. m. First addition of magnesite-basic open-hearth slag, 4:1, made around corners; 1200 kw. Walls glistening.
9:45 p. m. and 1:00 a. m. Additions made regularly as long as previous layer had become thoroughly sticky and pasty.
1:00 a. m. Bottom as high as possible on this set up. Shut off current and pulled electrode stubs. Bottom looking fine, walls have run slightly.
Second Set Up.
5:10 p. m. Current on, 500 kw.
6:10 p. m. Increased to 600 kw.
7:10 p. m. Increased to 750 kw.
8:10 p. m. Increased to 900 kw. Furnace getting very hot.
8:30 p. m. First addition of 6:1 immediately to rear of No. 2 electrode, where arc is directly striking. Walls glistening. Additions now being regularly made of 6:1.
9:40 p. m. Cut power to 700 kw.
10:50 p. m. Cut power to 600 kw.
11:40 p. m. Cut to 500 kw. From this point used all mixture in a moist condition and used spoon for all wall touching. All additions being made with current on.
3:40 p. m. Current off and stubs removed. Bottom looks fine and hard as rock.
Bottom 8 in. thick at center.
Total time 19 hr.

This bottom has been in use for a year and a half on 24-hr. operation, and has not given a bit of trouble.



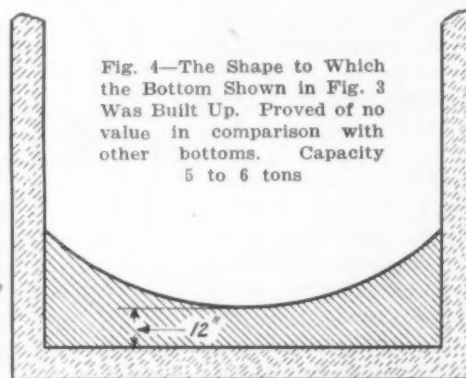
While on the subject of bottom making, it might be a good thing to mention the use of the cement gun. While not particularly applicable on such a small installation as ours, in the case of a 75 to 100-ton open hearth furnace, it has proved to be a wonderful aid

in bottom making and patching between heats. The best open-hearth bottoms are those put in the same way as indicated by the preceding log. The old way was to have a gang of men throw the patching material across the furnace with shovels. For this purpose the cement gun is now coming into large use. Some of its advantages are: The bottom can be made up while the gas is on and the doors down; there is practically no wasted material; the material is shot precisely to the points where wanted; the men can stand away from the heat, and only two men are needed to handle the apparatus; the time between heats can be materially lowered.

Experiments on Bottom

The bottom when first put in was as shown in Fig. 3. After following results very carefully on this shape of bottom, we allowed the bottom to "build up" to shape shown in Fig. 4. When our figures from this method were enough to prove the results, we changed to the shape as shown in Fig. 5. During this period we ran heats of 5 to 8 tons, keeping careful figures on all such points as time of melting down, refining, etc. From this mass of data we obtained the following points:

1. Bottom No. 1 melts down fastest. It takes longest to heat to the pouring temperature. Refining is not as good as No. 3. Trouble is experienced with side walls digging opposite the arcs. Due to its increased depth, there is a greater length of electrode necessary between the roof and the bath during melting down. In other words, due to the electrode's digging deeper, the holders must be fastened to the electrode



higher up. This results in a greater amount of electrode becoming heated and results in greater electrode consumption.

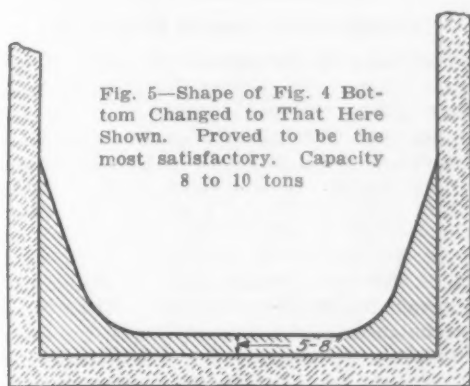
2. Bottom No. 2 proved to be of no value at all, in view of the working of the other two. It took greater power, more time, more electrode consumption in proportion, to turn out the smaller heats than with the larger heats on the other shape bottoms.

3. Bottom No. 3 proved to be the best all around bottom. While it did not melt as fast as No. 1, the total time per ton was less, due to shorter time of refining and superheating. Absolutely no trouble was experienced with side walls, and refining was possible without extra trouble, down to 0.005 per cent sulphur. The main point found was that with a bottom shaped as No. 3 it was possible to melt and pour 8 tons of metal, in the same time as would take for 6.5 tons on bottom No. 1, or 5.5 tons on bottom No. 2. On this bottom we have made 8-ton heats, for steel castings, in as short a time as 3 hr. 5 min. from the time current was put on until pouring.

Furnace Walls

Having determined the shape bottom which gave us the best results, our next step was made on the side walls. These were of 18-in. silica brick, two courses, laid flat. The bricks were made by the American Refractory Co., analyzing about 90 to 95 per cent silica,

and have proved very reliable. These bricks were laid perfectly dry and completely up to the roof ring. After running several linings we changed as follows: The lining next to the shell was run all the way to the roof, while the inside lining was run only as high as the arches. This made an 18-in. lining up about half way, and a 9-in. lining from that point to the roof. After obtaining our figures on this style of wall, we substituted magnesite brick for the silica brick, in the



inside lining for a space of about 2 ft. directly opposite each electrode. Then we did the same thing, using carborundum brick opposite the electrodes. Our next step was to use only 9 in. of brick in the walls, trying both silica and magnesite. In the near future we expect to try this with carborundum brick.

From our trials we found that:

1. Both with full 18-in. walls, and with 18-in. walls only half way up we experienced the trouble of having the brick burn through opposite the arcs. This is shown in Fig. 6. This weakened the wall and we had great difficulty with the upper part of the wall falling in when pouring. To overcome this we moved the electrodes 2 in. in toward the center of the furnace, but still had the same difficulty.

2. Magnesite brick opposite the arcs hold up much longer than the silica brick, but tend to spall severely, coming off in pieces 2 in. thick.

3. Carborundum brick burned off 2 in., while magnesite brick under them burned 9 in., and silica brick above burned through 18 in. These bricks gave excellent service, but at a price of \$1.75 per brick, the cost is prohibitive. We expect to put in a full wall of these bricks to determine exact costs of same.

4. Best results were obtained with only a 9-in. wall. While the loss of heat was greater, by lining a little oftener this was entirely overcome, and the extra cost of brick was saved by the ability of repairing in shorter time than when a full 18 in. was used.

While there are many other combinations of brick which could have been used, we feel that we have tried out enough to be able with certainty to foretell the condition of our furnace weeks ahead. We believe that as good results are obtained with only 9 in. of brick as with 18, figuring on a yearly basis.

Furnace Roof

Our roofs are made up in the standard way, using the common shapes of silica brick. The only experimentation done on the roof was trying out different heights from the bath. We have tried with the roof resting on the roof ring of furnace; with it 2½ in. higher; and with it 5 in. higher. We find that by raising the roof we save enough to obtain a few heats more from each roof, but it takes longer to get out the heats. Our present practice is to rest the roof directly on the ring. We are now collecting figures on the operation of a Griffin patent roof, which was put into operation a few weeks ago.

Carbon electrodes of 17 in. diameter and graphites of 10 in. diameter have both been tried with the balance in favor of the carbon. Our main objection to the graphites is the fact that they are too fragile and do not stand up under tonnage work. In addition they require too much lowering in the holders, causing a large amount of delays. With the carbons we found that they would melt quicker, did not break so much, required less lowering, gave better power figures, and in general under our conditions proved much better.

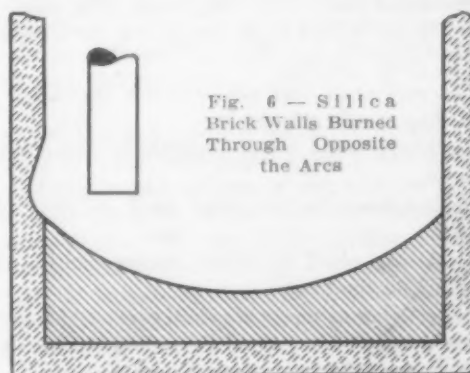
Slags

The slags are the heart of the electric furnace process. Under an oxidizing condition phosphorus is removed, while under a reducing condition sulphur is eliminated. As these impurities are removed by the slag it follows that the greater the amount of slag, the larger the amount of impurities that will be removed. It also follows that the greater the amount of slag, the greater the power necessary to melt and keep this in a molten condition. It normally takes about 530 calories to melt low carbon steel, while it takes about 650 calories for the same amount of basic slag. Therefore the slag requires more heat for the same amount than the steel, and all heat or power wasted in heating unnecessary amounts of slag is money wasted.

What Is Correct Amount of Slag?

The problem therefore is to ascertain the correct amount of slag to use to eliminate the impurities. As the base of the slag is lime, and this is practically infusible, there must be something else added to form a slag with the calculated weight of lime. There are two main materials, silica sand and fluorspar. Of these silica sand is much the cheaper, and if possible should be used in greater quantity than the fluorspar. Now the question comes up, "How much of these shall I use?" One naturally wishes to add enough to make the slag thoroughly fluid and yet not make it watery or tend to go acid, nor does one want to have a thick viscous slag.

After a large number of trials and experiments on this subject, we have adopted the following: Lime, 2 per cent of the charge; sand, 20 per cent of the lime; spar, 10 per cent of the lime; ground coke, two large scoops to each side, or four large scoops to the total. For our first slag we use 2 per cent of the charge lime only, the lime having enough dirt and sand from the scrap to flux it thoroughly. The second slag material is added half at a time, being thoroughly mixed on the



floor. In a large majority of cases this mixture will give a finished slag in 20 min. to half an hour. If anything this slag tends to come up a little thick, requiring one scoop of about 25 lb. of spar to finish it. The amount of ground coke will not affect the carbon in the metal and is the principal cause for a quick clearing of the slag. We have run hundreds of heats call-

ing for under 0.10 per cent carbon with this mixture and have seldom had an off analysis.

Alloys

All our alloys are added to the furnace. Our ferromanganese is added immediately after slagging off. Then when the slag has cleared and powders on exposure to the air we add the silicon. If alloy steels are being made, then is the time to add the alloys. This applies to chrome, chrome-vanadium, high silicon, manganese steel, and any others in which the alloy itself is likely to become oxidized. Copper and nickel can be added in the charge with no appreciable loss. Immediately the final alloys are added, the slag must be given a heavy dusting of ground coke to prevent any possible reoxidization. On heats under 0.10 per cent carbon, we add $\frac{1}{4}$ lb. of aluminum per ton of metal, in the ladle, to prevent any rising in the molds.

Pouring

We do not use any skimming gate when pouring. We do not claim that this is the best of practice, but find that the class of steels we make do not require such precautions. In a case for very high grade forging ingots, for instance, just a few minutes before pouring we throw a scoop of lime on the edge of the slag just inside the tapping door. This thickens the slag enough to act as a skimmer, the slag following into the ladle after the greater part of the metal. On heats of this kind we tap at a much higher temperature than required, add a few pounds of fluorspar in the ladle, and hold the metal in the ladle 10 or 15 min. before pouring any ingots. The fluorspar tends to bring any foreign matter to the top during the period when holding.

We have made numerous tests to determine segregation but have never found any to amount to anything. We lay this to the fact that the steel is completely finished before it ever touches the ladle, the pouring operation serving merely further to mix it.

Conclusion

After an intensive series of experiments we have adopted the following conditions as being more economical and efficient in every manner, under our conditions of working:

1. The bottom shall be nearer the shape of a saucer than a cup.
2. The thickness of the bottom shall be $\frac{5}{8}$ in., and shall be made of double dead burned magnesite, sintered in bit by bit.
3. The walls shall be of silica brick, 9 in. thick.
4. The walls shall be laid either dry, or with a thin coating of silica cement.
5. The roof shall rest not over $2\frac{1}{2}$ in. higher than the roof ring, preferably on it.
6. Electrodes shall be of amorphous carbon, 17 in. in diameter.
7. Dephosphorizing slag shall be 2 per cent of the charge lime.
8. First slag shall be added during melting down, never added on the hearth.
9. Deoxidizing or final slag shall consist of 2 per cent of charge lime; 20 per cent of lime sand; 10 per cent of lime fluorspar; 4 scoops ground coke.
10. This final slag charge shall be added a few minutes after slagging off, one-half at a time.
11. All alloys shall be added in the furnace, and steel shall be in a finished condition before the ladle is called for.

In closing, the writer again wishes to reiterate that the ideas expressed in the foregoing are not offered as a text on electric steel, but merely as a few suggestions of the great amounts of varying results which

can be obtained with the same apparatus, showing the great importance of the human equation. Our conditions as we found them may be a great deal different in another shop under different conditions, but the record of the experience may serve as a guide to meeting difficulties as they come. In the face of the present competition it is the shop with the best and most efficient "system" which will win out.

Causes and Cures of Depression

In discussing the current business situation, President F. C. Biggert, Jr., United Engineering & Foundry Co., Pittsburgh, states—"Always it is the arousing of the national consciousness to the fact that something is out of joint, or likely to go out of joint, that causes depressions. This time it is the foreign situation which looms largest as a disturbing factor. This situation is the inevitable consequence of our war commerce; its correction will be by the inevitable operation of the law of compensation, and a very long time, a great many years, will be required to re-establish the balance.

"To be sure we can recover our breath and go ahead within our own country and be prosperous for a long time, without any considerable commerce with other nations; but we must recognize and obey the natural conditions to be successful in this.

"We must buy from outside nations more than we sell to them, and to offset this purchase of foreign labor, we must occupy ourselves in the development of our own country to the highest possible state of economy. We need railroads and railroad equipment, improved highways, development of waterways, houses and farm machinery. We should develop our water powers to the end that less coal be consumed and should burn our coal more efficiently where we must burn it. We should study the economical use of all our labor and materials.

"Under our present conditions it will be difficult to do these things. Wise counsel and judicious government will be necessary to their proper consummation, but they are the key to our success in the future."

Improvements of American Roll & Foundry Co.

A program of improvements at the American Roll & Foundry Co. department at Canton, Ohio, of the United Engineering & Foundry Co., Pittsburgh, started in 1920, is now nearing completion. It includes an extension of 120 ft. to the roll and machine shops, 200 ft. to the foundry, new pattern shop, new blacksmith shop, modern office building together with various additions to equipment, including a number of cranes, roll lathes, new type air furnace, with waste heat boiler, and Fuller coal pulverizing equipment.

The plant produces gray iron castings, sand and chilled rolls, and is equipped for and makes a great many rolls for rolling iron, steel, spelter, brass, copper and alloyed metals, and also makes a specialty of rolls for rubber and paper mills.

"Peds" to Attach Trim to Concrete

The General Fireproofing Co., Youngstown, Ohio, is introducing to the building trade a "ped" or spot ground for attaching wood and metal trim to walls, and screeds to concrete floors. A ped consists of a nailing block of wood forced into a circular metal plate. The wood block, 2 in. in diameter, is treated to prevent rotting or swelling from moisture. The metal plate, $3\frac{3}{4}$ in. in diameter, is painted to prevent rust and perforated with $\frac{3}{8}$ -in. holes. The ped is bonded to the wall with plaster or to the floor with cement, and the plaster or cement comes through these holes and keeps the ped firmly attached to the basic surface.

When the plaster or cement has set, the walls are plastered flush with the top of the wood nailing block, and the floor screeds are nailed down. The peds form solid, permanent spot grounds in the walls for the secure fastening of wall trim, and a firm foundation for the wood floor.

Foundry Irons for Particular Uses

Differentiating Characteristics of Gray Iron, Mottled, Chilled or White—Skill of Manufacture—Analyses for Certain Castings

BY Y. A. DYER*

GRAY iron may be designated as a stable system ($\text{Fe}-\text{Fe}_3\text{C}-\text{C}$) when compared with white iron.

That is: at different prolonged cooling temperatures and concentrations, sufficient time elapses for its constituent parts—more particularly carbon—to reach a state of comparative equilibrium with reference to molecular adjustment. Therefore, when gray iron is permitted to cool gradually, its molecular structure follows more closely the curve lines of stability. During the cooling periods the iron carbide has sufficient time to decompose naturally into iron and carbon—part of the carbon separating out as particles of graphite. The presence of this graphitic carbon in cast iron controls its eutectic, or melting point, and largely determines its fluidity and freezing point. That is: the melting point of graphite has not been determined, and the specific heat of carbon is high (at 23650 deg. Fahr. it is 0.505) and varying with rise in temperature; therefore, the melting point of the iron will be high and the latent heat of carbon in solution high.

If an equal quantity of heat be given out (and it is) by the graphite when the reverse change takes place—in cooling—then the carbon, as it separates out of solution with the iron, must give up equally as high heat—hence the giving up of this latent heat by the carbon as it separates out through the different stages of cooling prolongs fluidity of the metal and controls its freezing point. Each time the metal temperature is lowered, its power to hold carbon in solution decreases; therefore, as more carbon separates out, additional heat is added by its dissociation.

It would seem that, in a measure, this is a rational explanation as to why the melting point of gray iron is higher than that of white iron; also why its fluidity is prolonged over that of white iron by reason of the high percentage of graphite present; and also why its freezing point is lower than its melting point. The iron carbide in iron is a very unstable compound, and when formed at a high temperature decomposes into graphite and iron according to the formula: $\text{Fe}_3\text{C} = 3\text{Fe} + \text{C}$. Later on, in discussing white iron, another phenomenon of the performance of iron carbide will be noted. A typical gray iron melts at about 2260 to 2280 deg. Fahr.

Mottled Iron

The classification of mottled iron, with reference to structural composition, may be described as partly gray and partly white iron; or the "hybrid" of cast iron—it is neither white nor gray iron. Its matrix contains particles of small size graphite and particles free from graphite; or cementite and pearlite. In the classification of pig iron it is graded as low silicon, 0.75 to 1.25 per cent, and contains high sulphur, usually 0.08 to 0.12 per cent. It is generally the product of an irregularly working furnace.

That portion of metal which lies between the chilled tread and hub of a carwheel, or between the chilled surface and core of a chilled roll, is typical mottled iron. The blending from white to gray is gradual, hence the nearer the approach to the gray portion of

the metal the larger the graphitic flakes will occur. It contains much free cementite, hence is inclined to be hard and brittle. A typical mottled iron melts at about 2200 to 2230 deg. Fahr.

White Iron

White iron is a supercooled solution of iron and carbon; and, compared with gray iron, may be considered an unstable system between Fe_3C and Fe . That is, its carbon is in an unstable condition, due to the iron carbide not having had an opportunity, during the rapid cooling process, to carry forward the reaction: $\text{Fe}_3\text{C} = 3\text{Fe} + \text{C}$. Thus, an iron suddenly cooled presents the spectacle of having its constituent molecules frozen before there has been sufficient lapse of time for proper "molecular adjustment"—hence the molecules are tense and subject to crack by sudden impact or rapid heating and cooling. By annealing such an iron a sufficient length of time, there will be created a "molecular readjustment," and high tension will thus be relieved.

Molecular readjustment may be illustrated by reference to the treatment of "fatigued" iron or steel. Thus, a chain or wire rope which has undergone severe strain of molecular structure may be materially strengthened by the application of heat to readjust its molecules and thereby relieve the tenseness. In the production of chilled carwheels it is very necessary that the wheels be placed in "soaking" or annealing pits, after having been removed from the molds at red heat, in order that there may be created a readjustment of the differentiating molecular structure of the three combined types of metal—white, mottled and gray—thus relieving the tension and preventing cracks and weakness.

During the quick-setting period of white iron the iron carbide has not had sufficient time to decompose into iron and carbon; therefore, after the solution of iron and carbon has set or frozen, this condition renders the carbon very susceptible to subsequent heat reactions. That carbon atoms are migratory, or move and are transferred, is fully demonstrated by the change of structure from white iron to malleable under intense heat; and by the fact that solid iron or steel will absorb carbon, upon being placed in contact with incandescent carbon.

It is possible to produce a white iron in the presence of 2.00 to 3.00 per cent silicon, and in the absence of much manganese and sulphur, if the mixture be melted hot and cooled quickly before the iron carbide has had time to break up. This fact is demonstrated by casting iron in chilled molds, or cooling it quickly by a spray of water. It is also possible for an iron containing a small amount of silicon and large amounts of manganese and sulphur to cool slowly and yet be white in nature. This is illustrated by casting grinding slugs and stars in green sand molds. A typical white iron melts at about 2000 to 2070 deg. Fahr.

Lack of reactions created by graphite separating out of solution, to prolong the fluidity of the metal, explains why the freezing and melting points of white iron may be considered practically the same. Hence white and mottled iron will melt at a lower tempera-

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ture than gray iron, and freeze at practically the same temperature.

Skill of Manufacture—Gray Iron

Compared with the high skill and art necessary in the production of chilled or hardened castings, there is usually as fine art and skill needed in the production of certain types of gray iron castings. The founder's wit and skill should be at "par" when he decides to enter the field of brake shoe manufacture, engine and automobile cylinders, piston heads and rings, projectiles, shells, propeller blades, ingot molds, welding rods, acid and alkali resisting castings, glass molds, stills, eggs, retorts, valves, fittings, etc. The relative importance of standardizing certain of these castings is briefly touched in the following paragraphs:

Brake shoes: A casting which will resist sudden and variable frictional wear, yet not be so hard as to break down in an irregular way the wearing tread of the wheel, should be the aim of the manufacturer of brake shoes. The silicon should be fairly low, sulphur low, phosphorus medium and manganese fairly high. The braking power of the shoe will be commensurate with its softness; but soft shoes wear more rapidly. One street railway system manufactures its own brake shoes; they are chilled throughout. This company is noted for the number of flat wheels on its cars; also for the "bell chimes" created by the shoes idling against the wheels while the car is in motion. The following analyses are recommended for brake shoes:

Percentage Contents					Total Carbon
	Si	S	P	Mn	
Hard	1.50	0.08	0.60	0.70	3.25
Soft	2.00	0.07	0.70	0.50	3.40

These castings are sold under a guarantee, hence the percentage of good foundry iron should be used as the base metal, with major percentages of steel and low silicon cast scrap.

Automobile castings: The manufacture of automobile cylinders requires a standard of high art. The cylinder specifications not only require minimum thickness, but maximum strength and density, to insure safety from impact of explosion and effective compression; also to care for contraction and expansion due to fluctuating temperatures. Minimum frictional wear is also essential. These are a combination of factors for solution by the most renowned construction engineers. The ingenuity of the molder is also put to a severe test, for much depends on the construction of the mold, and on the gating and pouring. Following are suggested analyses for cylinders:

	Si	S	P	Mn	Total Carbon
Medium	1.75-1.85	0.07-0.08	0.25-0.35	0.75-0.80	3.30
Light	2.00-2.15	0.06-0.07	0.25-0.35	0.60-0.70	3.40

Piston heads and rings should be of softer material, in order not to scorify or wear away the cylinder. The rings should be of a springy nature. Following compositions are suggested:

	Si	S	P	Mn	Total Carbon
Rings:					
Medium	2.00	0.07	0.40	0.75	3.40
Light	2.25	0.06	0.50	0.65	3.45
Pistons:					
Medium	1.85	0.07	0.25	0.60	3.40
Light	2.15	0.06	0.35	0.50	3.45

Projectiles; shells: Cast projectiles, ordinarily used by the Government for target practice, require for their production strict attention to melting practice; also gating and molding. A dried mold, whirl gate and bottom pour are features which will tend to soundness and homogeneity of casting. Shells should be cast vertically, and may number four to the flask for smaller sizes. Twenty-five per cent of steel scrap may be used to good advantage in large size shells, and

from 18 to 20 per cent in smaller sizes. Steel will lower the phosphorus and total carbon.

As compressive strength, or resistance to expansion, is an important requisite of shell metal, density is a controlling factor. Specifications usually call for 28,000 to 30,000 lb. per sq. in. tensile strength, and 18-in. impact. Inasmuch as the smallest pin-hole may cause the rejection of shells, it is necessary to minimize oxidation of the metal and guard against segregation, by the use of low phosphorus metal superheated and poured hot. Charges should be well fluxed; good substantial risers used, and metal be allowed to cool in the mold 4 to 6 hr.

Following analyses are suggested:

	Si	S	P	Mn	Total Carbon
Light, 3 to 5 in.	1.40	0.06	0.30	0.60	3.35
Medium, 6 to 8 in.	1.20	0.07	0.30	0.70	3.20
Heavy, 10 to 12 in.	1.10	0.09	0.30	0.80	3.10

Propeller blades: Because propeller blades are for use in both fresh and salt water, corrosion at once suggests itself. Low total carbon, with comparatively high graphite, resists corrosion from salt water. The silicon should not be too high, manganese medium, phosphorus and sulphur reasonably low. As much as 20 per cent steel will assist in lowering total carbon. If propeller blades are heated, and then coated with tar, the treatment will assist in resisting corrosion for a long period of time. Following analyses are suggested:

	Si	S	P	Mn	Total Carbon
Light	1.80	0.06	0.40	0.50	3.40
Medium	1.40	0.08	0.40	0.60	3.25
Heavy	1.15	0.10	0.40	0.70	3.15

Ingot molds: Service and economy are the prime requisites of ingot mold metal. The molds are bulky castings, but continued service depends on their composition; more especially the economy question, as old and worn-out molds are put through the open-hearth furnace for entrance into a new steel mixture. Therefore sulphur and phosphorus should be low. One steel plant produces periodically, for this purpose, in one of its small blast furnaces, a metal of the following analysis: silicon 1.80 per cent, sulphur 0.04 per cent, phosphorus 0.08 per cent and manganese 0.80 per cent. This metal is produced from steel scrap, manganous slag and silica rock. It is then put through the cupola, and poured as ingot molds of following analysis:

Si	S	P	Mn	Total Carbon
1.65	0.06	0.10	0.65	3.40

This analysis constitutes an excellent ingot mold metal, and its duplication in a cupola is suggested.

Welding rods: Clean and flawless metal with reasonably high melting and freezing qualities are desired in welding rods. High silicon, with its fluxing qualities, is a desirable element. Sulphur and phosphorus should be reasonably low and manganese medium. Following composition is suggested:

Si	S	P	Mn	Total Carbon
3.50	0.06	0.50	0.50	3.50

Snap graphite board flasks, inclined vertically, make desirable molds for casting rods. The product will be clean and symmetrically shaped. However, the rods may be successfully cast in dry or green sand. Because the metal section is small and the iron poured hot the grain will be close and even.

Acid-resisting Castings.—Of course, the ideal metal to resist corrosive effects of hot and cold acids would be one which approaches iron silicide; that is: an alloy metal which contains 12 to 15 per cent silicon, or following approximate analysis:

Si	S	P	Mn	Total Carbon
14.00-15.00	0.05	0.05-0.20	0.35-2.50	0.60-1.25

Such a metal, however, could not be classed as cast iron. This metal may be produced in an air furnace or electric furnace by the use of ferroalloys. The nearest approach to an acid-resisting metal, poured from cupola iron, would be of following suggested composition:

	Si	S	P	Mn	Total Carbon
Light	2.00	0.05 max.	0.30 max.	0.75	3.25
Medium ...	1.50	0.05 max.	0.30 max.	1.00	3.20
Heavy	1.25	0.05 max.	0.30 max.	1.25	3.10

Alkali and heat resistant castings come under the above analyses, with slight rise in silicon and lowering of manganese for heat resistant castings; and still further reduction of manganese for alkali resistant castings.

Gun Iron.—As the name implies, this metal once found its most practical use in ordnance work, mortar guns, cast iron cannon, etc. It has since gained quite a reputation for use in chilled rolls, gas and steam engine cylinders, piston rings, liners and various engine castings which require a smooth, dense and tough structure—"Hunt-Spiller" metal being a fair specimen.

This metal is also essentially a product of the air or electric furnace, in which the elements may be regulated to suit the specific casting required. Carbon control is ideal under such melting conditions, as well as silicon, sulphur, phosphorus and manganese, according to the lining used. While large percentages of steel may be used in cupola mixtures, yet the total carbon in resultant casting may vary considerably, due to the metal's contact with incandescent carbon. Additions of steel scrap will materially assist in accomplishing the desired results. The nearest approach to the analysis of gun iron metal in cupola mixtures would be the following:

	Si	S	P	Mn	Total Carbon
Light	1.80	0.05	0.35	0.60	3.35
Medium	1.40	0.06	0.35	0.70	3.20
Heavy	1.15	0.08	0.35	0.80	3.00

Skill of Manufacture—White Iron

There is no branch of foundry work where skill of operation and metallurgical knowledge are put to a more thorough test than in the manufacture of chilled or hardened castings. The real fine point to be observed in the production of hardened castings is the manner in which the transition of the white section is made to interlock or merge into the mottled section. It should be the endeavor of the producer to have the white fibers interlock or "dove-tail" into the matrix of the mottled section. This conditions decreases straight line cleavage areas and minimizes cracks. Manganese promotes a fibrous, tough chill, whereas sulphur is more conducive to cleavages and brittleness. High phosphorus also has a tendency to produce cleavages, as well as segregation.

For many years foundrymen clung tenaciously to the idea that it was absolutely essential to use charcoal iron in mixtures requiring a hardened or chill process. While modern foundry practice has to a great extent removed the barrier, the fact remains that dependable low silicon iron of high grade is yet peculiarly a product of the charcoal furnace.

As low silicon irons, 1.25 per cent and under, produced in a coke furnace, are likely to be "off grade" by reason of excessive sulphur or other causes incident to an irregularly working furnace, they may prove to be an inferior product. In many instances, however, it is possible to use the higher silicon coke irons, 2.25 to 2.75 per cent silicon, in chilled or hardened mixtures, by having available sufficient low silicon cast scrap, 0.50 to 0.70 per cent silicon, and steel scrap.

The following comparative results reported by Evans are interesting:

Mixture A	Per Cent	Analysis	Per Cent
Pig iron	11.6	Silicon	0.607
Steel scrap	8.3	Sulphur	0.148
Old wheels	80.1	Phosphorus	0.430
Ferromanganese	0.2	Manganese	0.563
		Graphite carbon	2.587
		Combined carbon	0.729
		Total carbon	3.316

	Tests Crack	Break	Chill
Average drop blow	27.6	60.2	0.51-0.60 in. Test Ingot
Hardness	477	Load	Deflection
Transverse 1 1/4 in. round-gray		2,948 lb.	0.123 in.
Transverse 1 1/4 in. square-chilled		2,611 lb.	0.043 in.
Mixture B	Per Cent	Analysis:	Per Cent
Charcoal pig	13.30	Si	0.634
Steel scrap	8.30	S	0.160
Old wheels	78.30	P	0.350
Ferro-manganese	0.05	Mn	0.425
		Graphitic carbon	3.191
		Combined carbon	0.344
		Total carbon	3.535

	Tests Crack	Break	Chill
Average drop blow	15.4	49.6	0.46-0.56 in. Test Ingot
Hardness	457	Load	Deflection
Transverse 1 1/4 in. round-gray		2,975 lb.	0.111 in.
Transverse 1 1/4 in. square-chilled		2,617 lb.	0.043 in.

Car Wheels.—An economical mixture, as well as one which will produce a wheel to stand all the requirements of the Master Car Builders' Association, may be made with the following materials:

	Si	S	P	Mn	Total Carbon
12.0 per cent pig	2.30	0.04	0.55	1.15	....
10.0 per cent steel	0.10	0.03	0.06	0.50	....
78.0 per cent wheels	0.65	0.12	0.35	0.58	....
0.3 per cent ferro-manganese				80.00	....
Wheel analysis	0.65	0.12	0.35	0.60	3.35

The depth of chill on tread of railroad carwheel ranges from 3/4 to 1 in.; street carwheels require considerably lower depth of chill. The safer policy would be to aim for a lower silicon content in a wheel, rather than a high one, for high-silicon iron or ferrosilicon may be quickly added to raise the silicon, whereas if the silicon should be too high, more drastic steps have to be taken to "pig down." Therefore, in mixtures for chilled castings, the silicon content in the metal mix should be low.

Chilled Castings.—Where only a hard, smooth chill is wanted, the manganese may range from 0.25 to 0.35 per cent; sulphur 0.07 to 0.10 per cent. This especially applies to chilled rolls. Following approximate analyses have proved good mixtures for rolls:

	Si	S	P	Mn	Total Carbon
Light	0.85	0.07	0.50	0.35	3.00
Heavy	0.60	0.08	0.35	0.35	2.85

Following analyses for other chilled or hardened castings have proved satisfactory:

	Si	S	P	Mn	Total Carbon
Plow points	1.25	0.07	0.50	0.85	3.10
Dies	0.85	0.08	0.40	0.50	3.00
Anvil blocks	0.85	0.10	0.35	0.60	3.00
Armor	0.70	0.08	0.40	1.00	3.00
Grinding balls	0.75	0.15	0.40	0.80	3.00

Rate of cooling also has its effect on the chill and texture composition of metal mixtures desired for hardened castings. The process is accomplished by the sudden cooling of the molten metal coming in contact with a metal chiller, the depth of chill depending on the chemical composition of the metal and the temperature at which it is poured. Chill test blocks are made 6 x 4 x 1 1/2 in., and are usually cast in the mold with the casting, and from the same ladle of metal, as a check or indication of chilling qualities.

Low silicon, high combined carbon and medium manganese are ideal chemical components, and hot unoxidized metal, poured at a temperature between 2400 and 2500 deg. Fahr., favors satisfactory chilling conditions. If melting conditions should be right, and careful attention given to the matter of pouring tem-

perature, higher silicon mixtures may be made to produce a deep chill. However, the metal must not be oxidized, or the resultant casting will be irregular and weak.

Iron properly chilled should show a structural mixture of cementite and pearlite, with quite an excess of free cementite; the mottled portion, in addition to cementite and pearlite, will reveal small patches of graphite; the gray portion will show relatively large

plates of graphite in pearlite, with a comparatively small amount of free ferrite in pearlite. The chemical composition of white, mottled and gray sections of hardened iron would be expected to approximate the following percentages:

	Si	S	P	Mn	Graphitic Carbon	Combined Carbon	Total Carbon
White....	0.65	0.11	0.40	0.50	0.05	3.25	3.30
Mottled...	0.65	0.12	0.39	0.52	1.50	1.60	3.10
Gray.....	0.60	0.13	0.38	0.55	2.40	0.80	3.20

CHINA BUYS LOCOMOTIVES

American Builders Secure Part of Large Order for Rolling Stock

WASHINGTON, Sept. 5.—Forty-one locomotives were required for three Chinese Government railroads, for which bids were received from 28 manufacturers, including British, German, French, Belgian, Japanese and American factories. The business was divided into four items and awarded as follows:

Item 1.—30 Prairie type locomotives for Pekin-Hankow Railway. Awarded to Forges Usines et Fonderies de Haine-St. Pierre Ateliers Metallurgiques Tubize Société Franco-Belge à la Croyere, Belgium.

Item 2.—6 English type locomotives for Shanghai-Hangchow-Ningpu Railway. Awarded to Forges Usines et Fonderies de Haine-St. Pierre Ateliers Metallurgiques Tubize Société Franco-Belge à la Croyere, Belgium.

Item 3.—2 Mikado type locomotives for Pekin-Suiyuan Railway. Awarded to American Locomotive Co.

Item 4.—3 Pacific type locomotives for Pekin-Suiyuan Railway. Awarded to American Locomotive Co.

Two hundred and forty all-steel cars were required, 100 of which were open and the others covered. Although three items were represented, all were awarded to Compagnie Centrale de Construction à Haine-St. Pierre, a Belgian company.

Bids were submitted in seven different currencies, and certain bids were rejected because the delivery offered was not as specified. The following table gives the lowest bid of each of the several nationalities:

Items and Nationalities	Bid		Equivalent in Taels
	Currency	Amount	
Thirty Prairie type locomotives:			
Belgium	Belgian francs.	452,550	55,210
Japan	Yen	85,000	62,475
United States	Dollars	42,200	68,510
Germany	Dollars	49,215	76,280
Great Britain	Pounds sterling	13,647	78,880
Six British type locomotives:			
Belgium	Belgian francs.	434,660	53,025
United States	Dollars	43,230	67,000
Great Britain	Pounds sterling	11,750	67,915
Germany	Dollars	49,540	76,790
Three Pacific type locomotives:			
Japan	Yen	94,000	61,740
Belgium	Belgian francs.	515,000	62,830
United States	Dollars	50,880	78,860
Great Britain	Pounds sterling	14,310	82,710
Germany	Dollars	53,910	83,560
Two Mikado type locomotives:			
Belgium	Belgian francs.	548,600	66,930
Japan	Yen	100,000	73,500
United States	Dollars	52,000	80,600
Great Britain	Pounds sterling	14,904	86,150
Germany	Dollars	57,000	88,350
One hundred all-steel "open wagons":			
Germany	Pounds sterling	612	3,540
Belgium	Belgian francs.	31,325	3,820
United States	Dollars	2,550	3,950
Japan	Yen	6,000	4,410
Great Britain	Pounds sterling	1,016	5,870

It will be noted that the relative positions of the various countries change very little and that the American product is competitive. Belgium and Japan were consistently lower, and Great Britain and Germany consistently higher, in prices for locomotives, than was the United States. It is necessary to make certain allowances in interpreting the above data. Specifications for the 30 Prairie type locomotives conformed almost exactly with the Belgian locomotive already operating, and the 6 British type locomotives are to conform strictly with existing locomotives of British manufacture. Certain bids were disqualified, even though nominally lowest, because they did not include all items as required for delivery as specified. The two Mikado and

three Pacific type locomotives were awarded to the lowest bidder that conformed to the specifications for a cast-steel bar frame.

These figures indicate what is to be anticipated in the present disturbed condition of international exchange. In spite of the fact that the American dollar is at a premium over all the other currencies, it is still possible to submit competitive prices. As the indications are that the amount of this premium will gradually decrease during the next few years, it should have the effect of placing American manufacturers in an increasingly favorable position.

If the Belgian franc stood at 10c. instead of 8c. it would have raised all of the Belgian bids 25 per cent. Also it is understood that a great deal of the steel now being made in Belgium is produced largely from scrap, rather than being worked up from ore, and is correspondingly cheap. As time exhausts these stocks it will probably be found that Belgian prices increase. It is noteworthy that the German bids on locomotives were in dollars; on cars, in pounds sterling.

Steel Corporation Analysis Methods

The various committees of chemists of the United States Steel Corporation have prepared up-to-date pamphlets covering the following subjects: "Sampling and Analysis of Iron Ores," "Sampling and Analysis of Pig Iron," "Sampling and Analysis of Fluxes, Cinders and Refractories," "Sampling and Analysis of Plain Steels," "Sampling and Analysis of Ferroalloys and Bearing Metals," "Sampling and Analysis of Gases," and "Sampling and Analysis of Coal, Coke and By-products." These pamphlets, it is announced, are prepared solely for the use of the chemists of the Steel Corporation and are of interest only to chemists. To limit the requests from outside sources, which the committee does not feel it can wholly deny, a charge on them of \$1 each has been imposed, payable to the Carnegie Steel Co., payment to accompany the request. The matter is in charge of J. M. Camp, chairman Chemists' Committee, U. S. Steel Corporation, Carnegie Building, Pittsburgh.

The evening courses of Pratt Institute, Brooklyn, N. Y., begin Sept. 22 for the trade classes and Sept. 26 for the technical classes. The technical courses include industrial electricity, practical electricity, technical chemistry, mechanical drawing and machine design, elements of power plant operation, stationary steam plant operation and automotive engine maintenance and repair. The trade courses include machine work, pattern making, foundry practice, forging and heat treatment and machine shop foremanship.

The President of the Argentine Republic has sanctioned a decree authorizing a further increase of 4,500,000 pesos in the budget for sanitary works for the city of Buenos Aires during the current year. The money will be used in extending the radius of the water and sewer systems and will call for the purchase of pipe and fittings. The work is under the direction of Director de Obras Sanitarias de la Nacion, Buenos Aires.

Following an announcement by the Aetna Nut Co., Southington, Conn., last week of a reduction in wages of 15 to 25 per cent, about 10 per cent of the employees, mostly roughers on heavy and light rolls, walked out, and the plant was obliged to suspend operations. The plant had resumed last week following a long period of inactivity.

British View of American Steel Making

Blast Furnace and Open-Hearth Practice Compared—Coke-Oven Gas as a Fuel— Rolling Mills Here and in England

THE *Journal of the West of Scotland Iron and Steel Institute* publishes an article, "Snapshots of an American Pilgrimage" by R. Percival Smith, which was read at the June meeting of the society. The author is connected with the Lanarkshire Steel Co., Ltd., Motherwell, Scotland. His impressions were received on a "somewhat hurried visit to several important centers of the American steel industry" in 1920, and are of such interest as to warrant the reproduction of liberal extracts below:

Works Organization

What impressed me, and what would, I believe, be bound to impress every stranger going to America for the first time, is the splendid organization of the works. When you introduce yourself you see the general superintendent, who immediately refers you to his departmental chiefs, and the departmental chiefs approach you and talk to you about the plant as if the plant were their own property. It is a pleasure to see what personal pride they take in the mills and shops under their charge. They look upon their departmental chiefs as fellow-workers and accept suggestions from them readily. Men are not discouraged by being turned down again and again. The American never hesitates to give an idea a fair trial if he thinks there is anything in it. If a venture proves successful, the author is given full and due credit; if, on the other hand, failure attends an honest effort at improvement, the man responsible for the suggestion is not unduly discouraged.

American steel makers show no hesitation in exchanging views and experiences, and in holding out a helping hand to the competitor in difficulties. To whatever works I went in America I found they were in intimate touch with the others and could tell me what was happening elsewhere and direct me where to go to see things of interest.

Organization also has its outward and visible signs. Its impress is upon all American works; you cannot escape it. You go to America knowing you are going to a country where they worship hustle, and you may have a suspicion that this must go on with a reckless disregard of outward appearances. If so, there is a surprise in store for you. American works are kept in beautiful order, and put ours to absolute shame.

It is probably true that the American has in the past paid attention to speed production to the exclusion of every other consideration, but he is certainly beginning to realize that quality must not be sacrificed; and there is every indication that he is going to find means of producing good iron and steel without losing time about it.

The free interchange of views and experience has led to standardization of plant and method, and it is only in certain instances that difficulty seems to be experienced in coming to a complete understanding as to which is really the best. There appears to be no unanimity about the best type of gas producer, for instance; the Hughes and the Morgan gas machines seem to be struggling for mastery. Upon the question as to which is the best type of open-hearth furnace reversing gear there are sharp differences of opinion, and there is a bewildering variety of checker-work formations in use.

But though repetition in plant is very marked wherever you go, this does not imply that Americans are content to follow on in a well-defined groove. Changes take place rapidly. When it becomes known that alterations in one plant have been attended by success, others are not long in following suit. That changes are not looked upon with disfavor was unconsciously expressed by superintendents, who, upon hear-

ing that I had visited certain plants, wanted information concerning them, as they had not been there for two or three years, and showed evident disgust when it transpired that there had been no or only trifling development.

Far-reaching standardization has the obvious advantages of quick delivery and reduction of initial costs.

America has its difficulties—difficulties unknown to us. They have long hauls, and severe winter weather causes very serious disturbances. Works have to be fitted with large storage accommodation to tide them over the closed season, when sea and land is in the grip of winter. The American has faced these difficulties courageously. By wide application of machinery, handling costs have been greatly reduced, and plant equipment has been provided to meet every emergency. If errors have been made, they have been made on the side of over-equipment.

Ore Handling

A very good instance of ore handling is to be found at South Bethlehem. The yard there has a storage capacity of 1,000,000 net tons of ore. It is served by two ore bridges with 15-ton grabs. The ore in 75 trucks with side hoppers empties itself into concrete trenches running the length of the yard on both sides, and is lifted from there to the pile by the grabs. Special provision is made for dealing with solid bottom trucks, which are used extensively in the transport of ore. The loaded truck is run into a lattice-work drum, so placed that when it rolls on its pinion racks, thereby inverting the truck, the ore is emptied into hopper wagons on the road at the side of the trench. The method is simple and effective. As 75 tons are thus dealt with in 10 min., which corresponds to an hourly capacity of 400 to 500 tons, less than 1 cent per ton will pay for the service of the eight men in attendance.

From the yard the ore is transported in hopper wagons to the daily supply bins, whence it flows into the trucks that weigh it and dump it into the blast furnace skips. All operations are performed rapidly and with the minimum expenditure of time and effort. Though South Bethlehem has been quoted here, it is not singular. Many instances could be mentioned of plant for handling ore and coal and other raw materials.

To make direct comparison between Scottish and American blast furnace practice would serve no purpose, for the conditions in the two countries vary so widely. Some facts about American blast furnace practice are nevertheless bound to be of interest to us.

Mesabi ore, which is used largely, is a gravelly ore, very rich in iron and easily fluxed. The reducing agent is in every case coke, produced from the finest quality of coking coal, and very carefully prepared. It is screened to secure uniformity in size. The large coke goes to the blast furnaces, the smaller coke is sold for household purposes, and the coke breeze is, in certain cases at any rate, used by the works themselves for steam raising under boilers with mechanical grates specially devised for the purpose. American blast furnaces are generally about 100 ft. in height, the blast pressure varies from 18 in. to 21 in., and the output for 24 hr. from 400 to 700 tons. The average is probably anything from 500 to 600 tons.

From the steel makers' point of view, the quality of iron produced is highly interesting. So-called American standard iron has the following composition:

Silicon	0.75 per cent
Manganese	0.75 per cent
Phosphorus	0.70 per cent
Sulphur	0.04 per cent

Hot Metal Steel Practice

Cold metal practice is practically non-existent. Hot

metal practice may be said to be universal. That in July of last year duplexing, the more elaborate adaptation of hot metal practice, was not much in evidence is perhaps no matter for surprise, when the relation between the prices of pig iron and scrap at that time is taken into account. It is of great interest to note, however, that in some quarters doubts are entertained as to the economic advantages of duplexing, not on general grounds, but as the result of careful and exhaustive inquiry. In 1912 or 1913 an influential American corporation drew up comparative costs between the duplexing process of one of its plants and the ordinary hot metal practice of another, and came to the conclusion that, considered purely from the point of view of economy, the former has no advantage, or so very little that when you throw its disadvantages into the balance it is not worth consideration.

Hot metal practice in America is conducted on similar lines to what it is in this country, as much scrap entering into the composition of a charge as can be conveniently handled. The percentage of scrap used there on an average appears to be somewhat lower than is the case in the best-conducted plants in this country. Taking the composition of American standard iron into account, this is only to be expected. The analysis shows that it has a lower silicon content and a very much lower phosphorus content than the grades of iron in general use with us.

It follows from the foregoing that a strict comparison between British and American open-hearth practice is impossible, but there is no reason why we should not equal their very best practice, or even surpass it. Our latest plants do not differ widely in essentials from the latest American open-hearth plants. There is this to be said, however, that in America there does not appear to be the same tendency to under-power shops in certain essentials to the everlasting detriment of free unhindered production. The American believes in a margin of safety, and if mistakes are made it is usually on the side of liberality.

Gas Producers

To give an instance, the two 80-ton open-hearth furnaces at the Brier Hill Steel Works, have four producers for each furnace; each of the four has an hourly capacity of 3000 lb. This may seem over-generous, may be regarded as unwarranted extravagance, yet there is no gainsaying the fact that the average fuel consumption calculated over a year's operations is very creditable. We are bound to look upon a fuel consumption of 700 lb. per ton of ingots produced as a fairly satisfactory performance. Wherever producer gas is used in America, the figure quoted was approximately the same.

Mechanical producers of one form or another are universally installed. It cannot be said that producer practice is very carefully controlled. Generally speaking, we keep a more rigid check on the operations of the gas bench. But here again the American is amply blessed. Consider the following analysis of West Virginian gas coal:

Ash	7.0 per cent
Volatile matter	37.0 per cent
Moisture	2.0 per cent
Sulphur	1.0 per cent
B.t.u.	13,800

We might well envy him. The attitude of the American open-hearth manager is perhaps after all not to be wondered at. He is quite satisfied that all is well with the producers as long as the paces of his furnaces are satisfactory. He may, however, some day recognize that with systematic control of producer practice results would be even more satisfactory and, when fuel of less excellent quality has to be accepted, the consequences less serious. How serious they may be under existing conditions was exemplified in one plant where the usual supplies failed, and Indiana gas coal of the following composition had to be used instead:

Ash	8.5 per cent
Volatile matter	41.7 per cent
Moisture	10.4 per cent
B.t.u.	10,940

We would consider ourselves very fortunate if we were assured of a constant supply of such fuel, yet the

melting shop outputs in this instance fell off in alarming fashion.

Coke Oven Gas for the Open-Hearth

As you all know, producer gas is not used exclusively in America, nor yet to a preponderating degree, in open-hearth furnaces. They have a variety of fuels. At the top of the list stands natural gas. It is considered the best fuel of all, but its uses are now restricted. In having supplies of this gas America was richly blessed. Having come into such wealth without a struggle, the American failed, however, to appreciate it fully and squandered it. It is now available for melting purposes in a few places only, and in these cases provision is made for its immediate discontinuance. The American regrets its passing. Coke oven gas is employed largely. Its constitution and heating value is exemplified by the following analysis from the coke oven plant at Clairton, the most modern of its kind in the United States:

Carbon dioxide	1.65 per cent
Carbon monoxide	3.93 per cent
Illuminants	3.32 per cent
Carbohydrates	33.53 per cent
Hydrogen	54.11 per cent
Nitrogen	3.46 per cent
B.t.u.	578
Sulphur, per 100 cu. ft. of gas..	0.0606 lb.

Coke oven gas is very light, and consequently difficult to control. As far as my experience goes, only one firm in America uses it alone successfully; in all other cases that came under my notice tar was used with it, the tar being introduced above the gas by means of a small nozzle after passing through a special form of carbureter. Tar by itself is highly favored, in spite of certain drawbacks. Carburetion does not yet appear to have reached perfection, a black heart being very noticeable in the flame. The checkers soon become very dirty, and have to be cleaned out after a run which never seems to exceed 200 charges. The heating value of tar as fuel for open-hearth furnaces is, however, undoubted as long as the system is in good condition, and the speed with which a furnace thus heated melts and works a charge must be considered quite satisfactory. The amount of tar used per ton varies between 30 and 40 gal. Each gallon contains about 155,000 B.t.u., of which, therefore, 4,650,000 to 6,200,000 are expended in the manufacture of one ingot ton. If you express the results obtained with producer gas in the same terms, you will find that tar compares very favorably indeed with it.

Powdered Coal As a Fuel

The use of powdered fuel for open-hearth and mill heating furnaces has not hitherto been attended by success. The heat of the flame is intense, but its control presents great difficulties. Powdered fuel plant was installed in the melting shop at Clairton; the furnaces were, however, unable to stand it, and the men demanded their time. An experiment was then made with it in the mills, but abandoned when a hole was burnt through the bridge in an unguarded moment. Apart from this, powdered ash very soon chokes up the checker chambers, putting the plant out of commission. In connection with this question, the following figures supplied by Clairton of the heating values of the various fuels in use might be of some interest:

Blast furnace gas.....	90 to 110 B.t.u. per cu. ft.
Producer gas	140 B.t.u. per cu. ft.
Coke oven gas	578 B.t.u. per cu. ft.
Natural gas	1,000 B.t.u. per cu. ft.
Tar	155,000 B.t.u. per gal.

As has already been mentioned, the American open-hearth plant does not differ largely from ours. In keeping with a very liberal policy ample yard room is always provided, and generally adequate means for forwarding materials to the furnaces. In this respect America shows a superiority, but I do not think it can be said that its practice is in every respect superior to ours. The American is occasionally inclined to be coarse in his methods. Water cooling is a feature of melting shops both in the United States and Canada. Water-cooled doors and door frames are universally employed. Water-cooled ports are very common, and some form of bulkhead cooling is frequently installed.

In some instances the application of water cooling goes still further, as, for instance, at South Chicago, where the furnaces, as well as having all the equipment already mentioned, are fitted with devices for cooling skew-backs and slag lines.

The following details of the cooling arrangements in No. 4 shop at Homestead may be found interesting. It is very complete; the end walls are cooled by means of pipe lines, which are looped back and forth, the water being admitted at one side of the furnace and drawn off at the other. There are 10 loops in all—six of them below the charging floor level and four above. An 8-in. pipe cools the blocks and the bridges of the air wells, the air uptakes entering the furnace as in the case of the Maerz block. Doors and door frames are water cooled, and an 8-in. water pipe runs the length of the furnace both at the front and at the back, immediately under the bottom flange of the channel carrying the crown; 5,800,000 gal. of water are required for cooling purposes in 24 hr., when 14 furnaces are in operation.

Car casting has found general adoption in America, the ingot being stripped in a separate bay. This arrangement leaves more room in the casting bay.

An interesting feature of American open-hearth plant is the skull breaker. The tripod has been discarded, and in its place you find a gantry and crane, with magnet equipment for lifting the round balls that are in general use. It is obvious that the running costs must be low, as two men are quite sufficient for all purposes.

Figures dealing with the time occupied with furnace repairs are instructive. At Brier Hill, a plant near Youngstown, they put up a full back wall in 15 min., a front wall in 40 min., remove a Blair port pan and put another in its place in 20 min. without the aid of a crane, and perform a general repair in somewhat less than six days.

• American Blooming Mills

The blooming mill is an interesting feature of American steel works plant. The soakers of a 40-in. cogging mill in this country have a capacity of, say, 200 tons; the soakers of the 38-in. blooming mill at Duquesne, to take one instance, are capable of holding 500 tons in 3-ton ingots. Also a blooming mill in America is a specialist. It is generally called upon to break down ingots to blooms of a definite size.

If further reduction is called for before the finishing stage, another specialist, the roughing mill, undertakes the work, and to the finishing mills restricted tasks are apportioned. Mill work is characterized by far-reaching specialization.

You find elaborate blooming mills in America. That they perform an amazing amount of work is not astonishing. Take, for instance, the three-high blooming mill at the Ohio Works, or the continuous blooming mill at Gary, with its nine stands. In their way they are very interesting. But I do not think they could ever impress the stranger in the same way as the ordinary reversing blooming mill, in most respects so like our own. The days of the steam engine are said to be numbered, but at present the motive power is, as a general rule, supplied by twin compound condensing engines, though atmospheric exhaust is not unknown even in otherwise up-to-date plant. The work of these mills would call forth nothing but pleasure in the mind of the visitor. The following table shows the roll design and the procedure in the 44-in. mill at the works of the Youngstown Steel & Tube Co.:

First pass	12% in. groove
Second pass	55% in. slabbing
Third pass	3% in. groove
Fourth pass	8% in. groove
Fifth pass	5% in. groove

Breaking Down

Ingot, 20 in. x 22 in.; bloom, 7% in. x 3% in.

Slabbing—2 passes-t.o.*; 4 passes-t.o.	6
12% in. groove—2 passes-t.o.; 2 passes-t.o.	4
8 in. groove—2 passes-t.o.; 1 pass.	3
Slabbing—1 pass-t.o.	1
3% in. groove—2 passes.	2
Slabbing—1 pass.	1
	17

*t.o. = turnover.

You will observe that if the amount of work performed at each pass is greater than is the case with us, it is not strikingly so, yet 17 passes are given to the piece in 85 sec. by the stopwatch. The performance was even better at Duquesne, where, in the 38-in. blooming mill, 60 sec. only were required for 15 passes and 7 turnovers. It is inspiring to watch these mills at work. The crews give a fine display of team work; the engineman is not afraid to reverse his engine. All auxiliary gear is electrically driven, including the tilts, which work in slots in one of the side guides, and are raised and lowered by a bell crank on the motor shaft.

Finishing Mills

In finishing mills you find a bewildering variety, but they are all either continuous or semi-continuous. For sections the cross-country mill, a most attractive form of semi-continuous mill, appears to be highly favored, whereas for billets, sheet bars, and skelp, shapes for which there is a constant demand, the continuous mill seems to be almost universally employed. A fine example of this type of layout for the rolling of billets and sheet bars is to be found at the Trumbull Steel Works, Warren, Ohio. Here one 3-ton ingot is broken down to 8-in. sheet bars in one minute. When adequate supplies of steel are available, there is only one brief interruption in the amazing flow after every third ingot. The stoppage takes place to allow the cooling bank crane to lift the sheet bars out of the cradle. A red light flashes on as a warning for a short arrest of 15 to 20 sec.; the light goes out and work proceeds. To pass from one side of this mill to the other you go through tunnels beneath the rack. No undue precaution this.

The subject is a fascinating one, but also very wide. We can touch upon it only briefly. To conclude, it seems evident that the Americans are far ahead of us in mill practice, but for no very obvious reason. It may not be possible to introduce into this country the highly specialized mill, but apart from it we have leeway to make up. There is surely no reason why we should not be equal to the task. It is certainly not that we lack the men. We supply America with man material of the very best kind, with which they are obviously perfectly satisfied.

In my experience, Americans were seldom supercilious. I did, however, come across an exception. He was general superintendent, and was inclined to underestimate our powers. To his credit be it said, however, that he admitted the point frankly when it was suggested to him that Britishers were serving America very well. Scotsmen and Englishmen are to be found everywhere in highly responsible positions, carrying on the work of the great Republic, and, as it is no doubt still true that "there are as good fish in the sea as ever came out of it," there is surely no reason to despair. It is certain, however, that we would find it both useful and profitable to review our own position with a critical eye, and then, if we find that all is not well, to face unpalatable facts undauntedly, and to correct them in a courageous and enterprising spirit.

The Pittsburgh chapter of the American Society for Steel Treating has practically completed its program for its regular monthly meetings, which are held on the first Tuesday evening of each month. Included among the speakers are professors from the University of Pittsburgh, Harvard University, the University of Illinois and a number of men identified with various corporations and societies. At the first meeting of the new season, to be held at Hotel Chatham, Sept. 6, Prof. F. F. MacIntosh, Carnegie Institute of Technology, Pittsburgh, will speak on "The Metallurgy of Iron and Steel."

Repairs costing \$60,000 now are nearing completion at the New Castle, Pa., works of the American Sheet & Tin Plate Co., which has been closed down for some time. The plant will be ready to start in the near future.

SECRETARY HOOVER'S VIEWS

Germany Not the Dangerous Competitor Generally Described

WASHINGTON, Sept. 5.—Germany is not proving to be the post-war competitor in the commercial world that has been credited to her, said Secretary of Commerce Hoover. After stating that an investigation disclosed that Germany was not making inroads in the commercial field in Mexico to the extent reports have indicated, the Secretary alluded to the fact that Germany has been compelled to abandon orders taken for steel in Argentina. Specific reference was made to sales of structural material at low prices, against which, it is said, it has been found German mills cannot make delivery. This situation has been explained in THE IRON AGE. Mr. Hoover said also that not only does Germany lack the supplies and the ability to sell at prices quoted on steel and other products, but that the quality of material being produced was inferior and consequently has lost much of its marketable value.

The Secretary is entirely optimistic with regard to American trade prospects in South America and declared that the bugbear of ruinous competition in that market has gained credence in some trade quarters that is entirely unjustified by facts. Mr. Hoover said that Germany cannot undersell the American exporter in South America for any appreciable length of time because she cannot square the existing low cost of production in some lines with the economic problems she faces in keeping her industry going and in meeting the condition imposed with regard to war reparations.

Credit Facilities

"Insofar as German inroads upon American trade in South America are dependent upon alleged superior credit facilities, it is entirely improbable that any such advantage can be maintained. Credit terms in Latin America have been materially changed during the war, all exporting nations offering less favorable terms than

previously. The depletion of German financial resources makes it improbable that the long and favorable credit terms freely offered in some cases before the war can be continued, even though temporarily renewed. With the present financial difficulties of the German Government, which must inevitably be reflected in German finance and ultimately in German industry, there will be no opportunity for adopting credit policies which nations much stronger financially cannot duplicate.

"American manufacturers are in a more favorable position than previously as regards both banking and distribution facilities in South America. While an extensive American distribution mechanism has been built up throughout Latin America since 1914, the German system of banks and trading companies has been seriously damaged. Important German interests in public utilities companies and others have been liquidated and the whole basis for sales of German goods in South America has been materially weakened. Another factor of prime importance to American trade extension is the increased tendency toward American investments in Latin America. There will be no exportable capital available in Germany, as there was before the war, and South American countries will more and more look to the United States.

Reparation Payments

"The reparations payments will also handicap German exporters. The taxes necessary to raise them, however they may be apportioned among German export industries, must increase export prices to a point much nearer the world level. It is primarily by means of exports that the German Government must meet the reparations payment and the natural tendency will be to charge all that the tariff will bear.

"Altogether, it appears that the prospect of ruinous German competition in South America has been exaggerated. Even admitting the present advantages of German exporters, they are apt to be of a temporary nature, in view of the artificial basis upon which German industries rest at this time."

FRENCH COKE REDUCED

Now Quoted at 75 Fr. per Ton—Only 25 Furnaces Out of 312 in Blast—Railroads Busy

(Special Correspondence)

LONGWY, Aug. 16.—French ironmasters have lodged numerous protests against prevailing high freight rates from the interior to seaports and also against the high price of coke. As a result the price of coke has been lowered by nearly 35 fr. per ton at one cut. In fact, with the price of coke in France officially fixed at 75 fr. per metric ton, it is expected to have an important effect on surrounding countries. Manufacturers, however, are not satisfied with this improvement in the situation and are pressing the government to remove many of the present taxes imposed upon them.

It is reported that Poland contemplates an order for trucks and railroad material, the Government of Warsaw having recently communicated with the French Government on this subject. Speculating on the heavy decline in coke, Lorraine metal works are already quoting reduced prices. In fact, No. 3 pig iron (smooth skin quality) is quoted at 170 to 175 fr. per 1000 kg. for substantial orders. There are only 25 furnaces in operation out of the total of 312 in France. There is no doubt that such a large number of idle works is responsible for the drastic decline in the price of coke. Ironmasters in Nancy are persuaded that this new price of coke will enable producers to come nearer the German prices.

The railroads are becoming more active with orders. When the effect of the coke decline will have affected prices generally the railroads will no longer have reason to hold back. General optimism is also inspired by the situation in Russia. It is believed here that Russia will be progressively restored to business and

that French investments in that country, totaling many billions of francs, will, at last, become active.

Locomotive works are booking orders for repair and for new construction, and the decline in British and American exports will surely be a strong bid for fresh business, probably involving further declines in prices. Malleable castings and steel castings in general are suffering from the present depression, and the only alternative to save these works from difficulties is the booking of railroad orders. War material is in course of completion for Rumania and other Balkan countries.

English and Continental Prices

The following schedule, prepared by the Bureau of Foreign and Domestic Commerce, Washington, presents a comparative statement of (British) domestic and Continental prices during the first six months of 1921:

Months	No. 3 Foundry Pig Iron		Billets (Soft)	
	Home Price £ s.	Approximate Continental c.l.f. Price £ s.	Home Price £ s.	Approximate Continental c.l.f. Price £ s.
January	10 17 1/2	8 10	15 12 1/2	11 0
February	9 15	8 0	14 0	10 0
March	7 10	7 10	13 10	9 10
April	6 0	6 10	13 0	8 10
May	6 0	7 0	12 0	8 10
June	*6 10	6 10	10 10	7 10

Months	Wrought Iron Bars		Steel Bars	
	Home Price £ s.	Approximate Continental c.l.f. Price £ s.	Home Price £ s.	Approximate Continental c.l.f. Price £ s.
January	26 13	16 0	22 0	11 0
February	25 0	14 10	20 0	11 0
March	23 0	12 10	17 0	10 0
April	21 0	12 0	15 2	10 0
May	19 0	13 0	13 7	10 5
June	16 0	12 0	13 10	10 0

*Premium of approximately 10s. on basis price.
†No specified test.



Fig. 1



Fig. 2

HOBGING LARGE WORM WHEEL

Hurried Requirement Met by Using Horizontal Boring Mill—Arrangement Described

Confronted with the hurried requirement of cutting a worm wheel too large to be put on a milling machine in the regular way, the Erie works of the General Electric Co. met the situation in a unique manner. The hobbing was done on a horizontal boring mill, as shown in the illustrations, with satisfactory results. The method, as described by E. J. Edwards, superintendent of foundry maintenance, was as follows:

The blank was 46½ in. in diameter and the finished worm gear 45½ in. in pitch diameter, 190 teeth, with ¼-in. pitch, 14½ deg. angle of pressure. The method of handling was as follows: On a plate 5 ft. in diameter and 2¼ in. thick a 43-in. diameter ball race was cut for 1½-in. steel balls. The plate was leveled by being supported partly on the rear side of the mill bed and the overhang jacked up on a horse. Fig. 1 illustrates the arrangement.

A 4-in. pin at the center, surrounded by short pieces of ¼-in. drill rod, served as an axis with roller bearings. A second plate placed carefully on the first could now revolve on the ball bearings with very slight friction. The blank was placed centrally on the second plate and bolted securely to it. To get the required angle for the first or gashing cut, for which a fly cutter was used, both plates and the blank were elevated on one side by blocking and jacking, as shown in Fig. 2.

A mark was made on the lower plate and the upper plate divided as accurately as possible into 190 equal divisions. A roughing cut was taken with the forming tool, the table then being moved around to the next mark and another cut taken, this process being repeated until all the teeth were roughed. The overhang of the plates was supported, as shown in Fig. 3, and moved easily on the balls provided. This allowed the feed for depth of cut to be easily taken care of by the cross-feed screw with which the boring mill was already equipped. The finishing cut as illustrated in Fig. 4 was taken with a home-made hob cutter. Any lateral

play of the boring bar was prevented by a thrust collar on each side of the upright supporting the free end of the bar. The finished job set in plate gave satisfactory results.

Census Returns from Mineral Industries

WASHINGTON, Sept. 6.—A preliminary statement of the census of mines, quarries and wells, has been issued by the Bureau of the Census, furnishing comparative statistics covering the years 1919 and 1909 for the mineral industries. These statistics show by industries the number of enterprises reported and the amount received for the materials produced. Figures of interest to the iron and steel and allied industries follow:

Industry	1919		1909	
	Enter-prises	Value of Products	Enter-prises	Value of Products
Iron	292	\$219,539,000	176	\$106,947,000
Copper ¹	195	181,258,000	161	134,617,000
Lead and zinc ¹	432	75,579,000	977	31,363,000
Limestone ²	895	52,943,000	1,665	29,833,000
Abrasive materials ³	34	721,000	49	498,000
Fluorspar	54	2,334,000	13	289,000
Graphite	21	869,000	19	344,000
Magnesite	11	2,169,000	6	68,000

¹Includes reduction mills operated independently of mines and operations on old dumps and tailings.

²Excludes enterprises producing limestone for their own use in the manufacture of lime and cement.

³Includes enterprises producing emery, garnet, pumice, tripoli, diatomaceous earth, stone for hones, scythestones, whetstones, etc., and tube mill pebbles and liners.

Reflecting industrial stagnation in the Mahoning Valley is the decline in bank deposits. Two affiliated institutions report a loss in deposits of \$6,243,857 during the first six months of 1921, of which \$1,238,839 was through their foreign department. This was caused mainly by the fact that many depositors sent part of their earnings to relatives in Europe, or were out of work and, therefore returned to their European homes, or went to some other part of the country seeking employment.

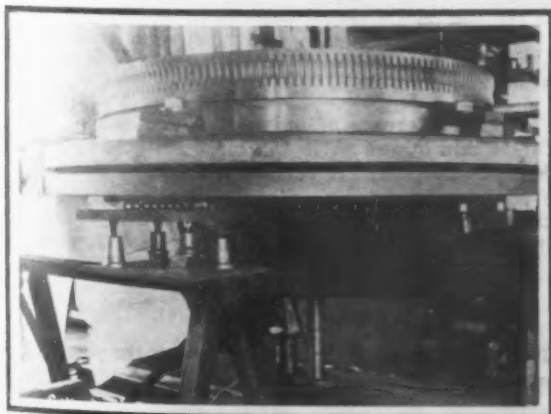


Fig. 3

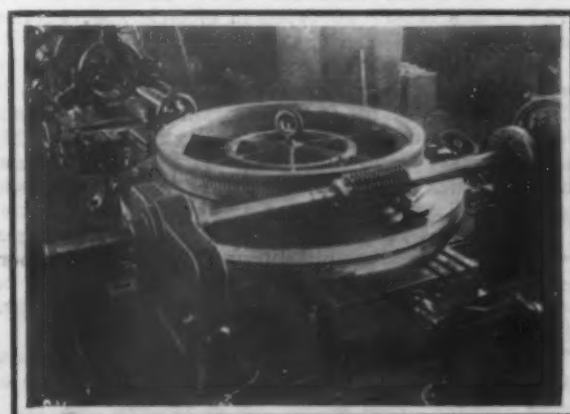


Fig. 4

Three Types of Alloy Sheet Steel—I

Proper High Tensile Material for Aircraft Parts—Specifications, Analyses and Manufacture of the Three Electric Steels

BY HORACE C. KNEER*

THE following report deals with an investigation of three commercial types of high strength alloy steel in sheet form, carried out at the Naval Aircraft Factory, Philadelphia, to determine which was the most suitable for the manufacture of fittings for large aircraft, such as the NC's of transatlantic fame. The word "fittings" is used to describe the many structural parts, made of sheet metal, which are used to connect, support and reinforce diverse members of an aeroplane. They are often of complex shape. Examples of such fittings are shown in the illustration.

Until the development of very large types of aircraft, such as the NC flying boats, low carbon sheet steel, having about 55,000 lb. per sq. in. tensile strength, or a mild grade of alloy steel, was satisfactory for fittings, as their thickness rarely exceeded $\frac{1}{8}$ in. But with the advent of planes weighing from 20,000 to 60,000 lb., the use of high strength steel became absolutely essential in order to avoid excessive thickness and weight in the fittings.

Steel was required having a tensile strength of 150,000 lb. per sq. in., combined with a suitable ductility to insure against brittleness. Deep drawing in manufacture was not called for but it was necessary that the steel be capable of severe cold bending in any direction, independent of the direction of rolling, of

successful welding by both the acetylene and electric spot methods and of brazing, heat treatment being applied after these operations. Sheets were wanted in thickness of from .035 in. up to $\frac{1}{4}$ in. and about 18 in. wide by 6 ft. long.

Alloy steel bar stock of the tensile strength indicated has been in fairly common use for years in the aircraft and automobile industries, especially in motor parts. It is not difficult to obtain on the market and the properties of the various types are fairly well known. It was found, however, that very few steel mills had any experience in the rolling of such alloy steel into sheets.

Comparatively little was known as to the rolling properties of the diverse commercial alloys and which, if any of them, would fulfill the required conditions in sheet form. After a canvass of the situation, it was decided to have samples rolled of the three most promising commercial types of alloy steel and to make a careful comparison of their characteristics.

It is believed that the results of this investigation will be of value to users of high grade sheet steel in industry, especially to automobile and aircraft manufacturers. The report, which follows, may also be of interest as illustrating the form in which a research investigation of this nature may be drawn up:

Specifications, Manufacture and Analyses

THE object was to investigate the comparative merits of three commercial types of high strength alloy sheet steel—chromium-vanadium, nickel-chromium (or "chrome-nickel") and 3.50 per cent nickel, for the manufacture of structural parts of aircraft.

The results in general were: chromium-vanadium steel was satisfactory in every respect. The other types, 3.50 per cent nickel steel and nickel-chromium steel, failed in the bend test, the nickel-chromium being the most brittle.

All three steels meet the required static tensile tests (except in thin gauges). They can be acetylene or electric spot welded. They can be brazed and heat treated after brazing. Any of the three steels can be machined in the annealed state without special difficulty, and can be drilled, cut and sheared in the heat treated state.

Aside from the bend test, the three steels did not differ greatly in any of the properties investigated, except that nickel-chromium steel was somewhat inferior to the other two types in electric spot welding and acetylene welding.

Thick specimens showed a better combination of tensile strength and elongation than thin specimens in all cases. The $\frac{1}{8}$ in. specimens failed to meet tensile test requirements. Their low strength was probably due to surface decarbonization, and their low elongation to smaller section area which permitted less necking down. Consideration should be given to this matter in specifications and design, especially with light gages.

Cross rolling slightly improves the tensile properties of the three steels, but has no noticeable effect on their bending qualities, at least, in so far as was shown by this test.

Since beginning this investigation, chromium-vanadium sheet steel has been used in the manufacture of

aircraft fittings for more than a year with satisfactory results.

Requirements and Specifications

Specifications, N.A.F.* S-35, were prepared to cover the purchase of alloy sheet steel suitable for the manufacture of fittings for the NC flying boats and other aircraft parts requiring high strength and reliability. The physical properties called for were:

Ultimate tensile strength.....	150,000 lb. per sq. in.
Yield strength.....	125,000 lb. per sq. in.
Elongation in 2 in.....	10 per cent*

*Later revised to 8 per cent.

It was desired to cold bend these fittings in manufacture, although deep drawing was not necessary. It was, therefore, required that the sheets be furnished annealed and the following bend test was specified:

Test pieces cut in any direction from sheets as received must stand cold bending, without cracking, through an angle of 180 deg. on a diameter equal to the thickness of the sheet.

The minimum radius of bend allowed in design was equal to the thickness of the sheet, so that this bend test allowed a fair margin of safety.

Some difference of opinion existed among manufacturers and others as to the most suitable type of alloy for this purpose. A certain latitude of choice for the steel manufacture was therefore believed advisable, and three recognized commercial types of alloy were accordingly included in the specifications, as follows:

3.50 per cent nickel steel (No. 2330).
Nickel-chromium steel (No. 3130).
Chromium-vanadium steel (No. 6130).

The bidder was permitted to select the type of steel which, in his opinion, was best suited to the require-

* Metallurgist, Naval Aircraft Factory, Philadelphia.

* Naval Aircraft Factory.

ments, both in regard to facility of manufacture and physical properties, and was required to state in his bid the type of alloy which he proposed to furnish. In order to obtain high quality, freedom from impurities and a low sulphur and phosphorous content, it was specified that the steel be made, or at least finished, by the crucible or electric furnace process.

The chemical analyses of the three types of steel were specified to be within the following limits:

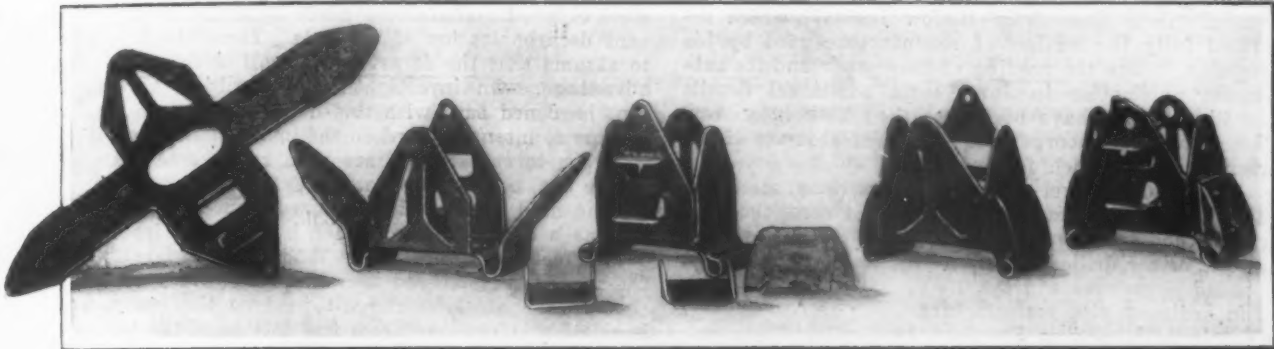
Type	Nickel, 3.50 Per Cent	Nickel- Chromium	Chromium- Vanadium
Steel No.	2330	3130	6130
Carbon	0.25 to 0.35	0.25 to 0.35	0.25 to 0.35
Manganese	0.50 to 0.80	0.50 to 0.80	0.50 to 0.80
Phos. (max.)	0.030	0.030	0.030
Sulphur (max.)	0.030	0.030	0.030
Nickel	3.25 to 3.75	1.00 to 1.50	0.80 to 1.10
Chromium .....	.....	0.45 to 0.75	0.15 (Min.)
Vanadium .....	.....	.....	.....

Certain objections were raised against these specifications. It was claimed by manufacturers that steels

It is noteworthy that the carbon content of these three experimental heats was the same, and that in the 3.50 per cent nickel steel and the chromium-vanadium steel, the carbon, manganese, nickel, chromium and vanadium contents closely conformed to the desired or mean values of the specifications. The nickel-chromium steel was taken from a heat made up prior to having received these specifications, and the nickel and chromium contents differed from those called for. The composition was believed by the manufacturer to be one that would certainly yield the physical properties desired.

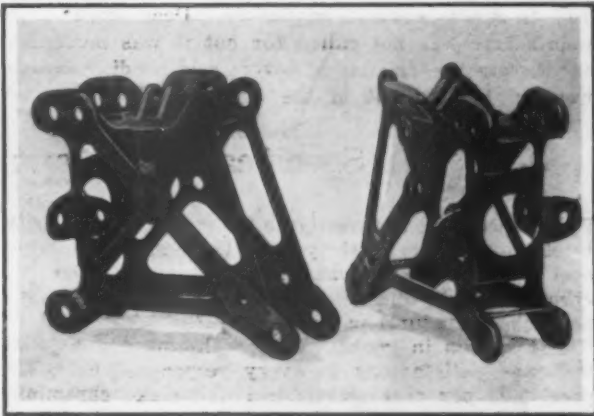
Rolling and Annealing

Sheets 1/4 in thick and 1/2 in. thick were rolled from each type of steel. In order to determine whether cross rolling would improve the physical properties or cold bending qualities, some sheets of each heat and thickness were cross rolled, the others being straight rolled.



Some of the Many Structural Parts of Thin Sheet Steel Used to Construct and Support the Members of Large Aircraft Such as the NC Flying Boats

In the upper row: Successive stages of wing beam hinge; after welding, fitting is dip brazed and then heat treated. In the lower is a box fitting made of seven pieces which carries a load of ten members



within the required analyses would not meet the physical requirements and that if the carbon content were sufficiently high to insure the tensile strength called for, the steels would not meet the bend test nor possess the required ductility or elongation after heat treatment.

It was also claimed that one or another of these steels would not roll properly to thin sheets or would scale excessively in rolling and that certain of the alloys would segregate and the strength therefore vary and be unreliable. Doubt was also expressed whether these steels could be readily machined and whether they would weld properly.

Manufacture and Analyses of Samples

In order to determine the relative merits in manufacture, fabrication and physical properties of these three types of alloy steel, and to determine whether any modification of the specifications was desirable, the Halcomb Steel Co., of Syracuse, N. Y., through the courtesy of Dr. John A. Mathews, undertook to roll an experimental heat of each type and to submit samples for investigation and test.

This company prepared three heats of electric furnace steel, having the following heat analyses, respectively:

Type	Nickel, 3.50 Per Cent	Nickel- Chromium	Chromium- Vanadium
Steel No.	2330	3130	6130
Heat No.	49-H-19	X-1819	155-H-19
Carbon	0.29	0.29	0.29
Silicon	0.28	0.19	0.27
Manganese	0.69	0.40	0.77
Phosphorus	0.011	0.016	0.007
Sulphur	0.007	0.008	0.023
Nickel	3.51	3.45	0.97
Chromium .....	.....	0.88	0.97
Vanadium .....	.....	.....	0.16

*The nickel-chromium steel differed in analysis from No. 3130, called for.

Check analyses made on test specimens at the Naval Aircraft Factory confirmed the above data reasonably well. A carbon content of 0.25 per cent was obtained.

(Cross rolling means rolling transversely to the axis of the ingot or billet. Straight rolling means rolling along the axis.) All sheets were hot rolled to finished size.

The manufacturer annealed all the sheets together, packed in boxes. They were brought to a temperature of 1500 deg. Fahr. (815 deg. C.) after which the temperature of the furnace was lowered to about 1300 to 1350 deg. Fahr. (705 to 735 deg. C.) and held for several hours, followed by slow cooling. This method of annealing was determined upon by the manufacturer as representing good commercial practice but it was not claimed that some other combination of time and temperature might not give better results.

Twelve samples of sheets, each 3 sq. ft. in area, were received from the manufacturer for test, as follows:

Type of Steel	Mark No.	Thickness	Rolling
Chromium-Vanadium ..	5	1/4 in.	Straight
" ..	6	1/4 in.	Cross
" ..	7	1/4 in.	Straight
" ..	8	1/4 in.	Cross
Nickel-Chromium	9	1/4 in.	Straight
" ..	10	1/4 in.	Cross
" ..	11	1/4 in.	Straight
" ..	12	1/4 in.	Cross
3.50 per cent Nickel....	13	1/4 in.	Straight
" ..	14	1/4 in.	Cross
" ..	15	1/4 in.	Straight
" ..	16	1/4 in.	Cross

It was difficult to tell which was the true longitudinal or transverse direction of the sample; speci-

mens were marked L and T to indicate these directions according to the surface appearance of the sheet, but these marks do not indicate with certainty that the specimens were longitudinal or transverse, respectively, in all sheets. They merely serve to distinguish between specimens cut in different directions from the same

Tensile specimens were machined to a 4-in. gage length, $\frac{1}{2}$ in. wide. The elongation was measured in 2 in. and in 4 in. Bend specimens were made 1 in. wide and about 4 in. long. The edges were rounded. sample.

(To be continued)

Manufacture of Drill Steel from Hollow Ingots

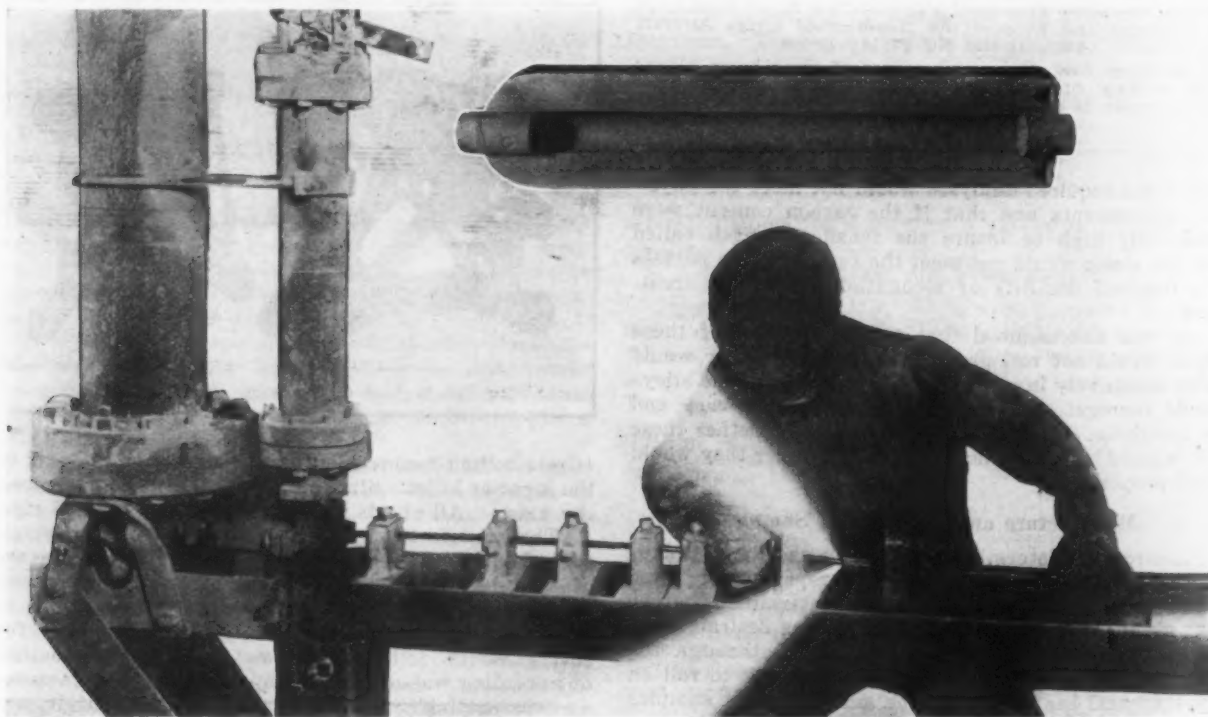
Process Used by the Ludlum Steel Co. and Its Advantages—Influence of Decarbonized Layers

AT the symposium on drill steel which was a feature of the February meeting in New York of the American Institute of Mining and Metallurgical Engineers, P. A. E. Armstrong, vice-president Ludlum Steel Co., Watervliet, N. Y., read a paper entitled "Drill Steel from Hollow Ingots," which described fully the method of manufacture used by his company. Since the reading of this paper and its subsequent publication in June, some additional details and illustrations have been furnished THE IRON AGE. These have been incorporated in a brief abstract of the original paper which follows:

Hollow drill steel is made by various methods: (1) The drilled billet with a sand-filled core, the general method used in this country, or (2) The drilled, pierced, or the drilled and pierced billet, not sand-filled, is rolled down over a projectile or ball much the same as in ordinary pipe manufacture. The second method is employed largely in Sweden. In Sheffield, England, the general scheme is sand-filling. Swedish hollow

ture? If it is a disadvantage, then why is it that steel of this character has such a good reputation for being a good grade hollow drill steel? There is nothing in the steel that can be discerned microscopically or by analysis that proves it to be superior to hollow drill steel of good manufacture made by methods that prevent decarbonization of the hole. Therefore it is fair to assume that the decarbonized wall of the hole is an advantage. On investigating this subject we found that hardened bars with this decarbonized hole do not become so intensely hard on the inside, neither are they so prone to cracking. Bars with radial cracks are of course bad, no matter what the system of manufacture.

The mild steel or decarbonized iron inside the hole acts as a damping effect when hardening is produced. This effect can probably be readily appreciated when the fact is remembered that if a piece of about 1 per cent carbon steel be rough-turned so that all decarbonization is removed from the outside of the bar and this be heated up to just above the transformation point



The Insert Shows a Hollow Cast Ingot by the Tube Method Which Has Been Split on a Planer Without Cutting Through the Plugs

High Pressure Blast Is the Method Employed to Remove the Sand from the Core or Hole in the Bar as Shown

drill steel is particularly good and has a worldwide reputation for excellency. It does not follow, however, that steels made by other methods are not efficient.

In the Swedish material a peculiar condition is present. The hole is badly decarbonized by the method of manufacture and the extent of this decarbonization varies in bars of different makes.

Decarbonized Layers and Hardening

A question that is worth consideration is this: Is this decarbonized core an advantage or a disadvantage? If it is an advantage, why not duplicate this by controlled practice and not haphazard means of manufac-

and quenched in water of about 70 deg., the bars will come out hardened in spots in a non-uniform manner. Some places will be hard; others will not. If a further length of the same steel be rough-turned and then ground and polished, this bar, subjected to the same heat treatment and the same speed of cooling, will come out quite file hard all over and not at all spotty. The reason for this is that the rough turning holds the steam arising from the heated metal in contact with the water, and thus causes certain zones to cool at a slower rate than those places where the steam which is generated was quickly removed.

In the case of the polished bar, there is no rough-

ened exterior to hold steam pockets and the steam, as generated, quickly rises to the surface of the cooling fluid and the bar is uniformly hardened over its entire surface. If this bar, which is polished, were covered with a thin tube, then the hardening would not be very pronounced underneath the tube. This of course would vary with the thickness of the tube and whether or not the tube was in good contact with the bar. Such a condition can artificially be produced by decarbonizing the surface of this polished bar. If this decarbonization is carried to a fair depth, $1/32$ in., the bar will not be of maximum hardness underneath the decarbonized area after being quenched in water. The thicker the zone the less will be the hardness, and for the same reasons which prevent one from uniformly hardening a piece of similar carbon steel right through to the center when quenched from just above the transformation point. Another way of saying this is that the speed of cooling is only fast enough for a certain amount of penetration or depth of hardness. To harden right across the cross section, alloy steels have to be resorted to, which have a greater lag to transformation.

Hollow Steel from Hollow-Cast Ingots

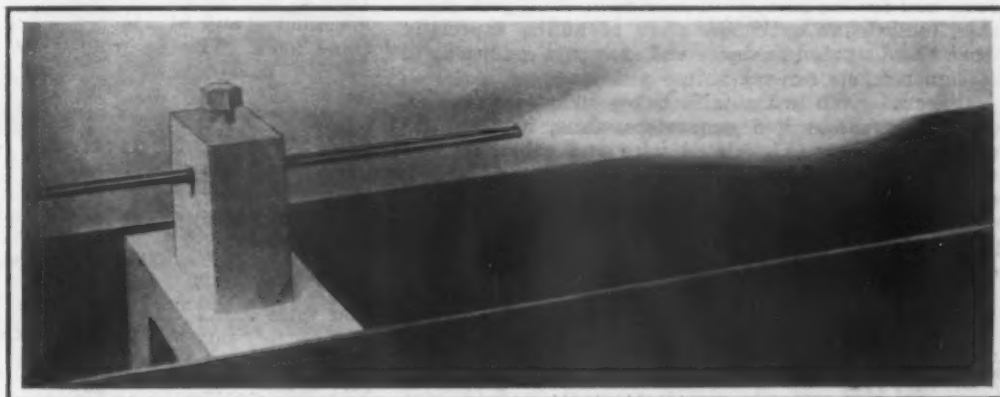
Hollow drill steel made by casting the metal around a tube and mechanically working the hollow ingot down to the required size (filling up the hole with sand and later removing same after rolling) will have an artificially produced equivalent decarbonized core which will be free from any such tendency toward splitting

cleaned well by sandblasting before being put into the ingot mold and a very excellent weld is produced between the thin wall of the tube and the hot metal. The tube being of mild steel has a higher melting point than the higher carbon of the molten steel, therefore although there is a surface weld between the molten metal and the tube, there is no tendency, or very little tendency, for the tube to burn through. A large number of ingots have been cast by this tube method and not one has burned through. The holes drilled in the plugs are filled up by the molten metal which forms a pin to hold the plug into the tube and in the cast ingot.

One of the illustrations shows a hollow cast ingot by the tube method which has been split on a planer without cutting through the plugs and the holes filled up with the molten metal forming pins can be clearly seen at each end. The smooth, accurate shape of the hole can be readily appreciated and attention is drawn to the particularly small amount of pipe at the top of the ingot, showing the steel to be quite free from gas. As can be seen the weld is nearly perfect down the entire length of the tube. The sand is not removed from the ingot after casting as this sand is employed for the purpose of maintaining the shape of the hole during rolling. The ingots are sent away to the 18-in. mill furnace, reheated to the required rolling temperature and the ingots rolled down to $3\frac{1}{2}$ to 4-in. square billets, depending upon the finished size of the bar.

The method of cutting up billets is interesting.

The Volume of Sand and Air Coming Out at the End of the Small Tube as Contrasted with the Usual Method of Using Only the Air Blast



and driving in radial cracks. The surface of the inside of the tube will be comparatively smooth, giving a uniform cooling rate to the inside of the bar, again reducing the tendency for a radial crack to start.

One of the reasons why the carbonless walls of the tube of the bars made by this method do not crack in manufacture is because the mild steel tube is not the result of a decarbonized steel highly impregnated by oxygen and oxides and having a number of microscopical holes where the carbon of the carbides last resided. These holes are places of weakness which may or may not weld up, depending on whether the interior of these microscopical cavities is coated by an oxide layer or filled with gas, either from the gas occluded in this steel or that which has penetrated from the furnace atmosphere. Decarbonized steel is, in my opinion, less strong than mild steel which has been originally made in low carbon and worked down to the required size.

The method employed by the Ludlum Steel Co. in the manufacture of hollow drill steel is to insert a high-grade low-carbon mild steel tube, suitably cleaned by sandblast, into an ingot mold and cast the hot metal around the tube. A mild steel tube, carbon about 0.15 per cent, is plugged at either end and filled up with sand. The hole is drilled through the tube and plugged but it is not pinned; the hole is left open. The tube is then inserted into an ingot mold which is recessed at the foot and a guide is fitted on the top of the tube, centering the tube with the ingot mold. This guide carries a pouring head. In pouring the ingot the hot metal is poured into the pouring head and the metal runs through four small nozzles down the four corners of the ingot mold and around the tube. The tube is

The shear on which these billets are cut is offset slightly so that the end of the billet is dragged down, thereby effectually closing the end of the hole of the billet, cutting out the necessity for plugging. The billets at this stage are just where the usual method of making hollow billets starts, the usual method being to take a $3\frac{1}{2}$ -in. billet and drill $1\frac{1}{2}$ -in. hole down the entire length of it and plug either end of the billet after filling with sand. The billets are then carefully inspected, chipped and ground to cut out any imperfections that may have arisen during manufacture, then sent to the 9-in. heating furnace and rolled down on the 9-in. mill to required size. The bars after inspection are topped and sent to the extracting room.

An illustration shows the machine in operation. High pressure sand blast is the method employed to remove the sand from the core or hole in the bar. The large tube to the right of the machine is the air reservoir carrying high pressure air and the smaller tube parallel with it carries fine sand which has an equalizing valve so as to maintain the same pressure in the sand canister as in the storage. As the air passes across the orifice at the bottom of the sand canister a quantity of sand is sucked down with the air and carried along the small tube which is inserted inside the hole of the bar. The cutting effect of this very high pressure sand blast is quite extensive. It is possible to wear away or drill a hole in a piece of steel by the action of this high pressure sandblast.

The other illustration shows the volume of sand and air coming out the end of this small tube. The usual method is to use an air blast, but this is not quick enough. Another method is to use water in the place of air, known as the hydraulic method. This again

is not so effective as using sand blast. Peculiarly enough there is very little wear on the inside of the tube carrying the high pressure sand blast, as the sand is traveling in the same direction as the tube and the skin friction against the inside of the tube has the effect of driving the sand to the center of the tube and does not scour out the inside of this small tube, which varies in size from $\frac{1}{4}$ to $\frac{3}{16}$ in. It is possible to clean out a $\frac{1}{4}$ -in. rd. hollow drill steel bar, 20 ft. long, by this process in about one minute.

This method of making hollow ingots and the method of removing the sand from the inside of the bar are covered by patents issued and applied for and is claimed as a big step forward in economical and successful manufacture of hollow drill steel and hollow tubes and tubular bodies generally. The reasons why we believe the tube method of hollow drill steel manufacture is superior to the older methods are:

Greater freedom from external and internal straining.
Because of the inherent small crystal size.
Absence of harmful segregation resulting in weakness of the wall of the hole.
Less liability for the steel to crack in the inside of the hole during forging or hardening.
Toughening effect, arising from the mild steel wall of the hole, limiting the intense hardening on quenching.

Electrical Exports Increase

WASHINGTON, Sept. 5.—In the face of a world-wide trade decline, exports of electrical goods from the United States are maintaining a strength beyond that evidenced by many other commodities. Figures for July, and for the first seven months of 1921, just available, indicate an optimistic state of affairs especially when the disturbed business and exchange conditions in foreign markets are taken into account.

Figures given in the table below include: Batteries, carbons, dynamos and generators, fans, heating and cooking apparatus, insulated wire and cable, interior wiring supplies (including fixtures), arc and incandescent lamps, magnetos, spark plugs, etc., meters and measuring instruments, motors, rheostats and controllers, switches and accessories, telegraph, including radio, telephones, transformers and electric locomotives.

Exports of Electrical Machinery

	1920	1921	Increase
July	\$6,494,332	\$6,840,512	5%
First seven months	54,095,088	71,618,254	32%
Fiscal year 1913		\$27,045,332	
Calendar year 1919		\$9,925,689	
Calendar year 1920		102,870,434	

Italian Metal Market Still Stagnant

MILAN, ITALY, Aug. 17.—Prices are unchanged except for copper and brass goods, which have taken another drop. This continued downward movement can only be accounted for by the small demand.

Pig iron is in very small demand; Eglington No. 1 is quoted at 1000 liras (\$44) per ton c.i.f. Genoa, and English hematite, mixed numbers, at 600 liras (\$26.40).

Here are this week's prices, largely nominal, in lire, f.o.b. Milan, per 100 kg., compared with prices in June and July at dates named:

	June 30	July 27	Aug. 13	Aug. 13 Per Lb.
Copper, electrolytic	600	630	650	13.00
Copper sheets	1020	1040	1020	20.40
Brass sheets	900	900	880	17.60
Brass wire	875	880	860	17.20
Brass rods	550	560	535	10.70
Brass tubes	1070	1100	1080	21.60
Black sheets, base, 4 mm.	150	160	155	3.10
Galvanized sheets, No. 20	240	235	235	4.70
Tin plate, standard, per case.	165	175	175	\$7.70

The United States Shipping Board has transferred the title to a building, erected by the Mesta Machine Co. three years ago at its plant in West Homestead, Pa., for the Shipping Board, to the Mesta Machine Co. The sum involved in the transfer was \$152,065. The building, a structure 60 x 400 ft., was erected according to the deed, with the understanding that it was to be taken over by the machine company at half its cost of erection following the completion of a contract between the two parties. The transfer of the building is in accordance with that agreement.

BRITISH MACHINERY TRADE

Machine Tool Tonnage Greater Than in 1913—General Movement Smaller

Figures compiled in the American consulate general in London show that, despite a heavy falling off in tonnage of general machinery imports and exports of Great Britain in 1920 and 1921, as compared with 1913, the trade in machine tools has actually increased. Imports of machine tools during the first six months of 1921 were 10 per cent above the figure for the first six months of 1913, while in exports the corresponding increase was 52 per cent.

Machine tool imports were 3.63 per cent of the tonnage of all machinery imports in 1913; 16.8 per cent, in 1920; 6.36 per cent in 1921. Similar figures for exports show 2.47 per cent in 1913; 4.95 per cent, in 1920; 4.69 per cent, in 1921. In value, these figures would be slightly increased, due to the fact that machine tools average higher in unit value than the balance of the machinery entering into British imports and exports.

Textile machinery formed the largest single item shipped out in 1913, 1920 and 1921, with 88,082 tons, 21,139 tons and 79,282 tons respectively. Agricultural machinery provided the largest tonnage of imports in 1913 and 1921, with 18,007 tons and 4911 tons respectively; and, with 4685 tons in 1920, stood second to machine tools, with 7176 tons.

Unit values have advanced heavily, standing in 1921 at approximately 3 times the 1913 figure for all machinery, and at $2\frac{1}{2}$ times the 1913 figure for machine tools. This is brought out clearly in the table.

	First Six Months of—		
	1913	1920	1921
Imports			
Tons	56,121	42,740	35,284
Value	£3,754,233	£9,215,542	£6,997,965
Unit value	£66.90	£215.60	£198.30
Exports			
Tons	346,252	182,471	276,637
Value	£16,867,776	£23,822,933	£41,120,395
Unit value	£48.71	£130.57	£148.66
Machine Tools, Imports			
Tons	2,040	7,176	2,243
Value	£185,312	£1,567,278	£509,571
Unit value	£90.83	£218.40	£227.18
Machine Tools, Exports			
Tons	8,545	9,035	12,977
Value	£501,532	£1,214,936	£1,885,151
Unit value	£58.70	£134.46	£145.29

British Company to Make Surface Combustion Apparatus

British Furnaces, Ltd., Millbank House, 2 Wood Street, London, S. W. 1., England, with an authorized capital of £25,000, was organized in the early part of July, this year, to manufacture and sell in the British Empire apparatus developed by the Surface Combustion Co. The principal stockholders of the new company consist of the Bryan-Donkin Company, Ltd., machinists and founders, Chesterfield, England; Woodall, Duckham & Jones, Ltd., engineers and manufacturers, London, and the Surface Combustion Co., Inc., 366 Gerard Avenue, New York, owner of the surface combustion patents and manufacturer of industrial furnaces.

The Compagnie Generale de Construction de Fours, 32 Rue de la Grange-aux-Belles, Paris, France, is the sole licensee and manufacturer for surface combustion patented apparatus in France and its colonies, Belgium, Holland, Switzerland, Italy, Spain and Portugal.

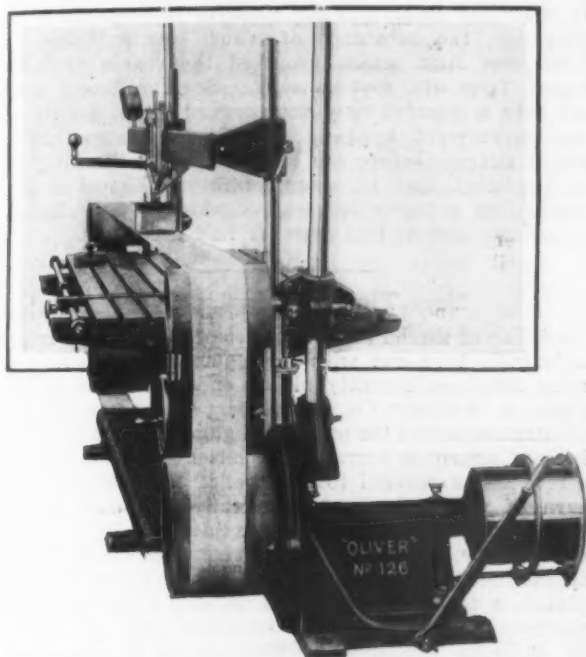
John H. Bartlett, Jr., foreign representative for the Surface Combustion Co., New York, has had charge of this work in the last few years.

The Blaw-Knox Co., Pittsburgh, will occupy booth 716 at the coming National Exposition of Chemical Industries, Sept. 12 to 17 inclusive, in the Eighth Regiment Armory, New York. The company's exhibit includes welded steel plate work, operating models of clam-shell buckets, and sample Blaw-Knox prudential section steel building; also photographs of various other products, including forms, structural steel buildings, transmission towers, water-cooled furnace appliances and miscellaneous steel plate work.

Belt Sanding Machine

The Oliver Machinery Co., Grand Rapids, Mich., has placed on the market a new machine for the rapid sanding and polishing of line and edge moldings, and for sanding and finishing built-up pieces such as desks, chairs, etc. It is said to be adaptable also to the polishing of metal.

The machine as shown in the accompanying illustration will take work of any length and sand to center of 72 in.; taking work on the table 54 in. high and over the floor plate, 72 in. high. There are no over-



The Belt Runs Down Instead of Up to Overcome Breaking of the Sand from the Belt

head belts. The belt is arranged to run down over the pulley instead of up, a feature which not only makes operation safer but is said to overcome the breaking of the sand from the belt, giving the belt a longer life. The idler is adjustable up or down to height of the work and can also be adjusted in a tilting position to keep the sand belt from running to either side of centers. A countershaft is provided to take up belt slack by means of which a flexible tension to suit the work is maintained. Sanding belts up to 10 in. wide may be used.

The table is 32 x 96 in. and rolls on ball bearings, a slight push causing it to run the full travel of 36 in. The vertical adjustment is 14 in. The table top is made up of plain wood strips with 1-in. gaps between to allow dust to drop through. The table is provided with an adjustable bar to hold the work. An edging attachment is mounted on the power stand arm and is used for sanding edge work. It is made up of a belt plate adjustable table that can be tilted to 45 deg. up or down and raised or lowered at will. The machine weighs 1400 lb., and is 80 in. high over all, the floor space required being 72 in. wide and any length preferable. It can be arranged for either belt or motor drive and with or without sanding-pad attachment.

Society of Industrial Engineers to Meet

Industrial stability will be the main theme for discussion of the fifth annual convention of the Society of Industrial Engineers, to be held in Springfield, Mass., Oct. 5, 6 and 7. The topics on the program cover production, finance and accounting, sales and industrial relations.

Among the addresses announced are the following: "Why Industrial Stability Is Essential to the Prosperity of the Country," by F. M. Feiker, assistant to Herbert Hoover, Secretary of Commerce.

"Setting Sales Standards," by E. St. Elmo Lewis, New York.

"Securing the Sales Force's Co-operation in the

Attainment of Sales Standards," by Norval A. Hawkins, director of sales General Motors Corporation, Detroit.

"The Influence of Foreign Trade upon Industrial Stability," by Hon. Eugene Meyer, Jr., managing director War Finance Corporation.

The plant inspection committee has selected the following plants for inspection trips: American Bosch Magneto Corporation, Rolls-Royce of America, Inc.; National Equipment Co., Westinghouse Electric & Mfg. Co., Moore Drop Forging Co., Gilbert & Barker Mfg. Co., Greenfield Tap & Die Corporation, Greenfield, and Fisk Rubber Co., Chicopee Falls.

Facts as to Living Costs Wanted

The Department of Labor, through the Bureau of Labor Statistics, is making a study of the methods of adjusting wage scales, and concluding collective wage agreements where cost of living figures enter into the wage adjustment. To that end, the Bureau of Labor Statistics wishes to communicate with the various companies, members of arbitration boards, labor managers, or others who are using cost of living figures in the determination of wage awards.

If any reader of THE IRON AGE, who has not already communicated with the bureau, is using cost of living figures in the adjustment of wages, it will be appreciated by the bureau if he will write to the Commissioner of Labor Statistics, Washington, and inform him of that fact.

Heavy-Duty Tractor Trailer

A trailer designed for heavy-duty service with tractors is a recent addition to the products offered by the Sharon-Pressed Steel Co., Sharon, Pa. The accompanying illustration shows the general construction.

The frame is made up of 4½-in. channel sections pressed from ½-in. steel riveted into one-piece channel-section corner pieces, pressed to a 6-in. radius, with a hole for the stake pocket. The two additional members running lengthwise are of 3-in. pressed steel channel, riveted to the end rails and braced laterally to the frame with V-braces which take the pull of the couplers. The couplers are of forged steel, ¾ in., either one or two being supplied as required.

The rear wheel and front caster supports are 3-in. pressed steel channels riveted to the side rails and



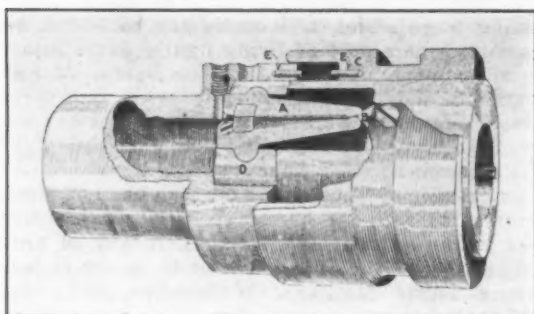
Rear Wheel Brackets Are Pressed from ½-In. Steel

longitudinal members of the frame. The rear-wheel brackets are pressed from ½-in. steel and have two stiffening ribs on each side, a construction that is claimed by the makers to be stronger than a malleable casting. The rear wheels are of malleable iron, have a 3½-in. face, and are mounted on 3-in. Hyatt roller bearings on a 1-in. hardened and ground shaft. The front casters are equipped with ball and roller bearings and are bolted to a ½-in. steel plate riveted to the frame. The floor of the trailers is 1¼-in. oak recessed flush in the side and end rails. All frame members are made flush on the bottom to afford even support when the trailer is used in connection with a lift truck. The trailer is designated as the Brute, and is said to have been tested with a load of 8000 lb., without showing signs of weakness. It can be furnished in sizes up to 72 in. long and up to 50 in. wide.

Positive Locking Friction Clutch

A friction clutch with a positive locking feature, designed to permit of starting its load under friction only and becoming locked against slippage when the clutch is completely engaged, has been recently developed by the Carlyle Johnson Machine Co., Manchester, Conn. This is not a completely new design, however, being but a modification of the standard Johnson clutch, the locking feature having been developed to cover the specific need of certain requirements.

Referring to the illustration it will be noted that an outside shifter sleeve carries a sliding wedge, B, between two toggle levers, A; these expand the friction ring, D, to grip the opposing surface of a cup member. This is briefly the principle of operation of the standard



The Locking Feature Consists of Six Pairs of Opposing Pins on the Edge of the Clutch and on the Shifter Sleeve

Johnson friction clutch. To this the positive locking feature has been added, consisting of six pairs of opposing pins spaced equally distant on the edge of the clutch and on the outside shifter sleeve, as shown at E E. When disengaged both the friction surfaces and the positive pins are out of engagement. As the shifting sleeve is thrown in, the friction surfaces take the load and practically pick it up to full speed before the opposing pins come into contact. With the full throw of the clutch the pins become engaged as a locked drive and slippage under load is impossible.

Senate to Increase Revenues in Its Tax Bill

WASHINGTON, Sept. 6.—No surprise was occasioned by the announcement that the Senate committee on finance had decided to re-write the House tax bill. The reason given was that it is desirable to include in one document every internal revenue law on the statute books. The House bill was characterized by Chairman Penrose as a series of amendments to existing revenue laws and he stated that it is the intention of the finance committee to make the bill "all inclusive." The measure is to be reported to the Senate when Congress reconvenes on Sept. 21.

But the conclusion of the committee to re-write the House bill does not by any means find its entire significance in the desire to make it "all inclusive." The fact of the matter is that the House bill is inadequate from a revenue point of view and it remains for the Senate committee to make up the deficiency. In other words, business and other interests are not going to be relieved of taxes to the extent that was stated by House leaders. From the outset there has been considerable skepticism that the Administration will save \$500,000,000 in the annual expenditures of the Government, as was planned in framing the House bill. A number of important suggestions for tax legislation that had been made by Secretary of the Treasury Mellon and supported by the Administration were ignored by House leaders. These were considered to be entirely practical and it is thought that they will be resorted to in part, at least, by the Senate committee, with a view to obtaining greater revenue than would be possible under the House bill.

Dr. T. S. Adams, Treasury tax expert, who assisted the House committee on ways and means, in preparing the revenue bill, is also co-operating with the Senate committee on finance. The suggestions of Secretary

Mellon, which were largely disregarded by the House, and which are being studied by Republican members of the Committee, involve an assessment of four billion dollars.

Some of the principles advocated by Mr. Mellon were a source of rather general agreement and in consequence are reflected in the House bill. These included such matters as the repeal of the excess profits tax and the lowering of the corporation income taxes. Senator Smoot, a leading Republican member of the finance committee, has prepared a substitute plan for tax revision which calls for a manufacturer's sales tax of 3 per cent, estimated to raise \$1,200,000,000. It is largely similar to the measure he prepared some time ago, the substance of which was published in THE IRON AGE, which proposed that taxes shall be raised from six sources only. Senator Smoot does not take a hopeful view with regard to the ability of the Government appreciably to reduce taxes. In a recent address before the Rotary Club in Washington, he predicted that in seven years the United States would face a \$5,000,000,000 tax which it was claimed would continue at this rate for half a century.

New Thread Templet Gages

A line of thread templet gages of the familiar round adjustable type but with improvement in the adjustment has been recently placed on the market by the Pratt & Whitney Co., Hartford. The accompanying illustration shows the assembled gage and also the locking-and adjusting screws. The latter is a short tapered screw placed parallel to the axis of the gage, one full turn of which changes the effective diameter of the gage about 0.001 in., adjustments finer than 0.0001 being easily made. When the locking screw is tightened the threads of the taper screw form a perfect dowel in both planes, a feature that is said to have been lacking in previous types of adjustable templates. The importance of accurate doweling to maintain a true helix is



One Full Turn of the Adjusting Screw Changes the Diameter 0.001 In

obvious. Both screws are readily sealed after setting. The first thread of the templet is chamfered to the angle of the thread, for ease in starting. The sizes are from 1/16 to 5 in. and larger.

International Engineering Dinner

A dinner to celebrate the homecoming of the mission of American engineers who went abroad to confer the John Fritz medal upon Sir Robert Hadfield of London and Dr. Eugene Schneider of Paris will be held at the Engineers' Club, New York, Oct. 10. The guests will include representatives of the British and French engineering societies.

The appointment of the following committee of arrangements for the dinner has been announced: Calvin W. Rice, secretary American Society of Mechanical Engineers; Frederick F. Sharpless, secretary American Institute of Mining and Metallurgical Engineers; Elbert M. Chandler, secretary American Society of Civil Engineers; F. L. Hutchinson, secretary American Institute of Electrical Engineers; Alfred D. Flinn, secretary United Engineering Society.

The Keystone Steel & Wire Co., Peoria, Ill., has disposed of a bond issue of \$3,000,000.

Steel Mill Electrical Engineers Meeting

Program of the fifteenth annual convention of the Association of Iron and Steel Electrical Engineers, which will be held at the Hotel LaSalle, Chicago, Sept. 19-24, has been completed. It follows:

Monday

9:30 a.m.—Business session—election of officers—9:30 to 12.
2:00 p.m.—“Some Recent Developments in Induction Motor Starting,” by M. Spencer. “The Electrical Engineer in the Steel Plant and Out,” by F. B. Crosby.

Tuesday

9:30 a.m.—“Electrification of Steel Plant Railroads,” by R. B. Gerhardt. “Anti-Friction Bearings in Steel Mills,” by A. M. MacCutcheon.
2:00 p.m.—Inspection trip.

Wednesday

9:30 a.m.—5:00 p.m.—“Fuel Requirements of Steel Mills,” by F. E. Leahy. “The Control of Boiler Operation,” by W. N. Flanagan. “General Use of Oxygen in the Steel Mill Industry,” by E. A. W. Jeffries. “Waste Heat Utilization for Steam Generation,” by G. R. McDermott.

Thursday

9:30 a.m.—Report of electric furnace committee, by E. T. Moore. Report of electrical development committee, by R. B. Gerhardt.
2:00 p.m.—Report of educational committee, by L. F. Galbraith. Comments on safety committee work, by Walter Greenwood.

Friday

9:30 a.m.—Standardization committee report, by W. T. Snyder. Electric Overhead Traveling Crane Specifications, by F. W. Cramer. Report of subcommittee on illumination, by H. L. Kirshberg.
2:00 p.m.—Inspection trip.
7:00 p.m.—Fifteenth annual banquet.

Accountants of Malleable Castings Plants to Meet

The quarterly meeting of accountants of the American Malleable Castings Association will be held at Hotel LaSalle, Chicago, Sept. 12 and 13. The program has not been entirely completed, but consideration will be given to a number of new accounting subjects of general interest, the treatment of which promises to be of exceptional value.

One session will be devoted to papers and reports on machine methods of accounting. These papers and reports will cover the character of the information recorded by the use of the Hollerith tabulating machine, the Stromberg recorders and other makes of machines in use by certain members. The reports will show, in addition to the nature of the information recorded, the results secured and the savings effected.

Another session will be devoted to a presentation of the subject of graph charts designed to show how information can be pictured for the ready grasp of the executive who finds it difficult to read figures and get therefrom their significance. The program will include also papers of an allied nature on the subjects of “The Opportunity of the Cost Accountant to Do Analytical Work for the Executive,” and “Daily Control Sheet for the Executive.” Consideration will also be given to approved methods of distributing miscellaneous indirect overhead expense, as well as to a number of other important subjects.

Robert E. Belt, secretary-treasurer of the association, is chairman of these meetings.

The Greenville Steel Car Co. has secured new business that will keep the plant in steady operation for the next three months at practically full capacity. President F. L. Fay closed in New York recently a contract for repairing or rebuilding 500 steel cars for the Erie railroad.

The Machinery Club of Chicago will hold its annual picnic at Thatcher's Woods, River Forest, Ill., on Saturday, Sept. 10. A tug-of-war, a baseball game, and a number of races and contests will be features of the outing.

COMING MEETINGS

September

National Exposition of Chemical Industries. Sept. 12. Eighth Coast Artillery Armory, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 12 to 19. Fall convention. Wilkes-Barre, Pa. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

National Association of Brass Manufacturers. Sept. 14 and 15. Fall convention. Cleveland. Secretary, W. M. Webster, 139 North Clark Street, Chicago.

National Association of Cost Accountants. Sept. 14 to 16. Fall convention. Cleveland Hotel, Cleveland. Session on morning of Sept. 15 on cost methods of trade associations. Offices of association at 130 West Forty-second Street, New York.

American Society for Steel Treating. Sept. 19 to 24. Annual convention and exhibition. Manufacturers Building, State Fair Grounds, Indianapolis. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention. Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting. Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting. Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting. Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting. Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

National Founders' Association. Nov. 16 and 17. Annual meeting. Hotel Astor, New York. Secretary, J. M. Taylor, 29 South LaSalle Street, Chicago.

More building permits were issued in Chicago in August, 1921, than in any similar period in the last seven years. The total number of permits issued was 1051 and the cost of the buildings constructed is estimated at \$13,165,000. In August, 1920, permits numbered only 308, and the cost of the buildings \$5,525,000. Of the total number of permits for the month just closed, 656 were for residences, 195 for apartment buildings and 150 for factories.

The National Tube Co. has purchased from the Second Avenue Passenger Railway Co. a tract of land on Second Avenue, near Brady Street, just west of and adjoining the National Tube Co.'s Second Avenue plant, Pittsburgh. The sum involved in the transaction was \$22,500. The plot has a frontage on the south side of Second Avenue of 77 ft. and a depth of 108 ft. The tract is improved with several brick buildings.

VALLEY OPERATIONS

Industrial Improvement Marked by Periods of Recessions

YOUNGSTOWN, OHIO, Sept. 6.—While industrial improvement in the Mahoning and Shenango Valleys continues to be mixed with periods of recessions, nevertheless the undertone is essentially strengthened. Iron and steel operations are scarcely in excess of 30 to 35 per cent of normal, varying with different interests. One of the principal fabricating interests in the district, for instance, is operating at 60 per cent and reports that incoming business may be expected to sustain this rate.

The fourth blast furnace in the Ohio Works group of the Carnegie Steel Co. will likely be put in blast in September, owing to the pig iron demands of this interest's open-hearth department. A number of stacks in the Shenango Valley will also be lighted this month, while the merchant furnace of the United Iron & Steel Co. at Leetonia, a Hanna interest, is now making iron.

In other industrial directions, there is a marked tendency toward improvement. For instance the Metropolitan Paving Brick Co. has recently started a unit at its Bessemer, Pa., plant which had been idle for fully 1½ years. A representative of the company says that demand for paving brick has shown substantial improvement of late and that the outlook is for a good run of business.

August shipments of the Bessemer Limestone & Cement Co. reached a new high level of 100,000 bbl., with production at 90,000 bbl. Both concerns report sustained betterment in demand from road and building construction interests.

Following a suspension of several months, the Falcon Steel Co. was scheduled to resume operations at its sheet mill plant at Niles this week.

New installations doubling the capacity of its sheet mills at Niles have been practically completed by the Republic Iron & Steel Co., and will be operated as soon as business conditions warrant. Some finishing work remains to be done.

The City of Youngstown has opened bids on cast iron pipe, valves and other materials to be used in connection with a proposed expenditure of \$600,000 for a new water distributing system.

Wages in the steel industry, however, are at a low ebb and there is considerable dissatisfaction on this point. Many men are earning less than \$100 a month in the face of high living costs, with an additional reduction in prospect.

The rolling mill at Charleroi, Pa., of the Electric Alloy Steel Co., Youngstown, Ohio, has resumed after a prolonged suspension. President L. J. Campbell states that August bookings exceeded those in July and the outlook is for continued good business. Manufacturers who have been out of the market for a long time are seeking material, he states.

Plant Operations

The smelting plant, Portsmouth, N. H., Navy Yard, in continuous operation the past seven years, has been closed. Old materials from most of the Navy yards and stations along the Atlantic Coast were reduced here.

The Ensign-Bickford Co., Simsbury, Conn., fuses, for the past six months operating a short-time schedule, is operating in full. Wages of employees have been cut an additional 10 per cent, making a total of 25 per cent within the past few months.

Four additional tin plate mills were put on at the Laughlin works at Martins Ferry, Ohio, of the American Sheet & Tin Plate Co. on Sept. 1. Of the 23 mills at this plant 16 now are under power.

Ten additional hot mills were put on at the Farrell, Pa., works of the American Sheet & Tin Plate Co., Sept. 2. This means that this plant is operating at 66-2/3 per cent as 20 of the 30 mills now are under power.

The Standard Steel Construction Co., of Port Rob-

inson, Ont., has reopened after a shutdown of six months. The entire force has been re-employed.

The Page, Hersey Tubes, Ltd., Welland, Ont., which has been operating on a part time basis, has started on a six-day week schedule.

The shops of the Southern Railway at Somerset, Ky., have gone on full time basis. The shops which normally employ about 600 men, have been running on part time since last April.

New Driver-Harris Rolling Mill

E. Cooper Wills, who has been engaged as general superintendent of the hot mills and engineer of the Driver-Harris Co., Harrison, N. J., has been in Pittsburgh recently completing the purchase of equipment for the new rolling mill plant on which the company is about ready to start construction. The mill building, which is of all steel construction, 275 ft. long, 100 ft. wide and 22 ft. in the clear, is to be fabricated, erected and completed by the American Bridge Co. The building will be equipped with a 20-in. break down and plate and sheet train, one 9-stand 9-in. mill for wire rods and merchant mill products, four modern type heating furnaces and two electric annealing furnaces. The 20-in. mill is to be driven by an 800-hp. direct-current motor and the 9-in. mill by a 500-hp. direct-current motor. A motor generator set for converting alternating to direct current also is part of the equipment. The mills will run on 600 volts and have a speed ratio of 600 to 300, this flexibility being required on account of the character of the products the company produces.

The products include nichrome, Monel metal, brass and various carbon steels. M. Hoagland Sons & Co., Rockaway, N. J., has the contract for building the mills. The Westinghouse Electric & Mfg. Co. and the General Electric Co. will furnish the motors and generator sets and Fawcett Machine Co., Pittsburgh, the drive for the 20-in. mill. Mr. Wills formerly was general superintendent and engineer at the Rahway, N. J., plant of Nagle Steel Co., and the layout and design of the new plant of the Driver-Harris Co. is entirely in his hands. When completed he will become general superintendent of this plant. F. L. Driver is president of Driver-Harris Co. and Leon O. Hart general manager.

No Date Set for Hearings on Metric System Bill

WASHINGTON, Sept. 6.—No date has been set as yet for hearings which are to be held in connection with the bill of Senator Ladd, of North Dakota, which, after a period of 10 years, would compel the adoption of the metric system, though metal working machinery interests would be excluded from its operation. The latter, however, along with manufacturers generally who are strongly opposed to the metric system, feel that even if they are ostensibly exempted, they would sooner or later be compelled to adopt it if it became established by law.

It is understood that the hearings will not begin until after Congress reconvenes. The subcommittee to conduct the hearings is headed by Senator McNary, of Oregon. The other members are Senator Weller, of Maryland, and Senator Jones, of New Mexico. Senator Ladd has stated that it is intended that both the proponents and opponents of the bill be given a hearing, after which the record would be circulated publicly and a subsequent hearing held to hear those whose interest had been aroused and a determination as to the desirability of such legislation be obtained. This is a similar claim that has been made with regard to previous hearings. The Ladd bill is identical with that of Representative Britten, of Illinois.

S. W. Platt, formerly Pittsburgh district manager for Luria Brothers & Co., Reading, Pa., engaged in the purchase and sale of iron and steel, recently filed a bill in equity in Pittsburgh claiming that the company owes him upward of \$80,000 in commissions, and asking the court to direct the company to make an accounting with him and pay him the sum which shall be determined to be due.

For a Duty on Foreign Ferromanganese

Manufacturers Favor Free Manganese Ores and Ask 25 Per Cent Protection on Their Product —A Charge of Dumping from Great Britain

WASHINGTON, Sept. 5.—The brief before the Senate Finance Committee in support of a duty in aid of the domestic manufacture of ferromanganese was presented on behalf of the following four companies:

Lavino Furnace Co., furnaces at Sheridan, Lebanon and Marietta, Pa., and Reusens, Va.

E. E. Marshall, furnaces at Harrisburg and Newport, Pa.
American Manganese Mfg. Co., furnaces at Dunbar, Pa.
Southern Manganese Co., electric furnaces at Anniston, Ala.

The statement of these manufacturers was submitted by John J. Howard, general manager Levino Furnace Co., Philadelphia, and is as follows:

Ferromanganese is an alloy of manganese with iron, used for deoxidizing, scavenging and hardening steel. Ferromanganese in previous bills has been improperly classified chiefly because there was no ferromanganese industry in this country to request for proper classification. Ferromanganese is truly a finished product. It is used by the steel man to complete his operation on the purification of pig iron but he does not have to refine the ferromanganese in any way. He takes nothing out of it nor does he add anything to it.

This alloy in former tariffs has been classed along with what may be called raw materials in schedule 3, but the Ways and Means Committee of the present Congress recognized the fact that it was a distinct alloy and put it where it rightfully belongs.

Need of a Ferromanganese Industry

As this is a steel-producing country and we must have a steel industry in order to make any progress and to protect ourselves in time of need, it is also clear that to maintain the steel industry we must also have a ferromanganese industry. This was very clearly demonstrated in the great war when the supply from abroad was suddenly cut off from this country. As steel requires protection, it is self evident that ferromanganese equally deserves protection.

Unless the American producers of ferromanganese are given proper protection at this time they must go out of business and sacrifice the furnace plants they have equipped for this product, entailing the loss of millions of dollars to the owners, loss of earnings to the American employees and loss to the country of a vitally essential industry.

Wars such as the recent one break out suddenly, but an industry like the ferromanganese industry cannot be developed over night nor are the ores available on short notice.

Shortly after the outbreak of the European war and before this country entered it there was practically no ferromanganese available for steel makers in this country outside of that produced by the United States Steel Corporation for its own use, so that the foreign producers could not continue to supply the needs of this country in addition to the European requirements. Therefore it was only through the acquisition of furnace plants and knowledge of where to secure suitable manganese ore in the foreign ore markets by the American ferromanganese producer that the industry was developed here to meet the situation. For the proper protection of the country we should be independent of any other country for our supply of ferromanganese on account of its vital necessity in the production of steel.

New Limits on Manganese

To be in accordance with the custom of the trade, we recommend to have the wording in H. R. 7456, paragraph 301, schedule 3, which now reads:

Provided, that spiegeleisen for the purposes of this act

shall not be an iron manganese alloy containing less than 45 per centum of manganese,

be changed so that it shall read:

Provided, that spiegeleisen for the purposes of this act shall be an iron manganese alloy containing less than 30 per centum of manganese,

and to have the wording in paragraph 302, schedule 3, which now reads:

Provided, that ferromanganese for the purposes of this act shall be such iron manganese alloys as contain 45 per centum or more of manganese;

changed so that it shall read:

Provided, that ferromanganese for the purpose of this act shall be such iron manganese alloys as contain 30 per centum or more of manganese.

This line of demarcation, having 44 per cent in manganese as the limit for spiegeleisen, is not in accord with the custom of the trade, as the standard grade of spiegeleisen is that testing from 18 to 22 per cent in manganese, although metal analyzing up to 30 per cent manganese is classed as spiegeleisen. By placing the maximum limit on spiegeleisen at 44 per cent manganese content it appears that some oversight was made, in view of the intention to give protection to the ferromanganese industry, and to correct the error the duty on ferromanganese should be applied on all metal containing over 30 per cent of manganese. It should be clearly understood, however, that metal containing 44 per cent of manganese should not be classed or considered as spiegeleisen.

Enormous quantities of manganiferous and ferruginous manganese ore exist in this country, therefore spiegeleisen does not need protection, whereas ferromanganese does. This will explain why a protective duty on ferromanganese is necessary and not necessary on spiegeleisen.

Domestic Ore Supply Insufficient

Due to our experience during the war, when we were unable to maintain an adequate ore supply for our furnaces, we became convinced that there was not a sufficient supply of domestic ore (a fact strongly supported by the independent steel interests in their testimony before the Finance Committee).

It is the consensus of opinion on the part of the steel interests and the American ferromanganese manufacturers, based on actual experience, that high-grade manganese ore of the quality necessary for the manufacture of ferromanganese does not exist in sufficient quantity or quality in the United States to support the ferromanganese industry, and even such small quantities as may be available occur in remote districts, principally in the Western States, from which the railroad transportation charges per ton alone to bring the ore to the Eastern States (where practically all the ferromanganese is manufactured and consumed) are in excess of the price at which high-grade foreign manganese ore can be landed at Eastern seaboard ports.

In other words, it is the contention of the independent steel interests and the American ferromanganese manufacturers that a duty of no less than 100 per cent on manganese ore will be necessary to afford any kind of protection to a few mining interests in the Western States who are laboring under the belief that with protection they will be able to produce and market high-grade manganese ore for the manufacture of ferromanganese.

An Exorbitant Duty

Even were we to assume that a certain tonnage of high-grade manganese ore could be produced in the

Western States, as was claimed by certain engineers and property owners who appeared before your committee, nothing short of an exorbitant duty on manganese ore would afford them sufficient protection to enable these Western mines to compete, since the American ferromanganese manufacturers will always be able to obtain their supplies of manganese ore in the foreign markets of the world at a lower price delivered at their plants on the Eastern seaboard, notwithstanding the duty they would have to pay thereon, as the railroad freight charges from the producing points in the West on domestic ore to Eastern points would exceed the duty that would have to be paid on imported manganese ore.

It seems to us that a duty on manganese ore will not serve the purpose desired, viz.: to protect the domestic miner, but only burdens the steel industry with a higher cost on ferromanganese, since the ferromanganese makers would naturally have to include in their cost of production the duty they would have to pay on the manganese ore.

The market price for high-grade foreign manganese ore to-day, delivered f.o.b. cars Eastern seaports, is between 20c. and 25c. per unit, which, calculated on an ore containing 50 units of manganese, is equivalent to from \$10 to \$12.50 per gross ton. On the other hand, the railroad freight rates on manganese ore from California common points, from the Butte and Phillipsburg, Mont., district, and from the Batesville, Ark., district (where limited quantities of high-grade domestic manganese ore are reported to exist) to Eastern consuming points (say Pittsburgh district) amount to \$18.66, \$14.18 and \$16.02 respectively, per gross ton.

The above mentioned market price of 20c. to 25c. per unit for foreign high-grade manganese ore averaging 50 per cent and over in metallic manganese may be considered as a normal price and not a price necessarily due to the present depressed state of business. The average price of foreign high-grade ores over a period of ten years prior to the war did not exceed 25c. per unit, or \$12.50 per gross ton, delivered Atlantic seaboard.

It is obvious from this comparison that unless a duty of over 100 per cent is placed on manganese ore no domestic ore will be produced.

The Steel Corporation's Policy

At the hearings before the subcommittee on metals of the Ways and Means Committee the question was asked of a representative of the United States Steel Corporation whether the corporation thought there was sufficient ore in this country to take care of the requirements. In replying he said the best answer to that question is that the Steel Corporation purchased a manganese mine in Brazil within the past year and its only regret was that it had not done so ten years ago. (The inference was that during the many years it had been purchasing the ore from Brazil it had paid enough in profits to the Brazilian mine owners to have paid for the mine.) This is conclusive evidence that the corporation concluded the ore did not exist in this country.

During the hearings before the Ways and Means Committee we asked for free manganese ore and a protective duty on ferromanganese. However, even though we knew the ore did not exist in quantity in this country, if Congress wished to impose a duty on ore for revenue purposes, we were satisfied if a compensatory duty was put on ferromanganese.

In filing this brief with the Senate Finance Committee we do not presume to know what form the final bill will take, but we are still convinced there is not an adequate domestic ore supply and that manganese ore should remain on the free list, and urge that a duty be imposed on ferromanganese of 25 per cent ad valorem, based on the American valuation. It must be borne in mind, however, that should your committee recommend a duty on manganese ore, there must necessarily be an adequate compensatory duty on ferromanganese, adhering to the ratio specified in H. R. 7456.

British Producers' Methods

The unfair methods practiced by the foreign pro-

ducers in the past lead us to conclude that only an exorbitant specific duty would afford the American industry adequate protection. It is for this reason that we should have an adequate ad valorem duty, with the added advantages of the American valuation plan to meet the situation.

As the result of pernicious propaganda on the part of the American agents of the English ferromanganese producers the question has arisen why, when former tariff bills did not carry a higher duty than \$4 a ton, it should now be necessary to impose a duty that would protect the manufacture of ferromanganese. We would like to emphasize again the fact that in former years there were no independent makers of ferromanganese in this country and consequently there was no industry that needed protection as there is at this time.

In the copy of the *Iron and Coal Trades Review*, the leading iron and steel trade journal of England, issue of Aug. 12, 1921, there appear on page 217 quotations on British made ferromanganese as follows:

76 to 80 per cent "for home consumption," £18 per ton.
76 to 80 per cent "for export," £14 per ton.

It is perfectly evident, therefore, that the members of the British pool are resorting again to their pernicious habit of dumping in this country to destroy the ferromanganese industry, in this case the differential being £4 sterling per ton lower than they will sell consumers in their own country.

Steel Companies Not Against a Duty

The steel interests admit that ferromanganese is one of the chief constituents and essential in the manufacture of steel, and it is therefore highly important that the United States should have its own ferromanganese industry by proper protection and that we should not be dependent on other countries for the supply of this most essential article.

The steel interests, as evidenced by their testimony before the Finance Committee, were not opposed to a duty on ferromanganese. They, however, oppose the high rate of duty of 2.2c. per lb. on the metallic contents, as proposed by the Ways and Means Committee, on the basis that it would add too much to the cost of their steel. The proposed duty on ferromanganese is necessarily high because it is burdened with a duty of 1c. per lb. on the metallic manganese in the ore.

The duty proposed in H. R. 7456 on ferromanganese carries protection to both manganese ore and ferromanganese in the proportion of about two-thirds for the ore and one-third for ferromanganese; therefore it is evident that if ore is permitted to remain on the free list and an ad valorem duty of 25 per cent imposed on ferromanganese, about 66 per cent of the high duty objected to by the steel producer will be eliminated and the necessary protection can be accorded to ferromanganese.

American Industry May Be Wiped Out

It would hardly be consistent for the steel interests to request that their own industry be protected and deny adequate protection to the ferromanganese industry. They assume that ferromanganese would cost them less if a small duty or no duty is placed on the product, overlooking the fact that unless a duty giving adequate protection is granted the American industry will cease to exist and they will have to pay the foreign producer an amount equivalent to the duty that would be necessary to protect the industry in this country. With the American industry out of the way the British producers would be able to fix the price for American consumption as has been their practice in the past.

We contend that the position of the American steel producer would not be changed, for in one case he pays a price for his ferromanganese which includes protection for the American industry and on the other hand, with no duty, he will pay the same amount to the foreign producer to sustain a foreign industry.

The dominating factor of the foreign producers is the British pool, whose avowed purpose is to reclaim the American trade and to drive the American maker out of business by unfair competition. This unfair

competition has already been brought to the attention of the United States Government and is in process of investigation by the Federal Trade Commission.

Output of Merchant Ferromanganese

The American producers of ferromanganese have at present ample furnace capacity to supply all the independent steel makers in this country even under war time consumption.

The accompanying table shows the production over a period, of only four of the producers, and as the output was governed by what was sold, it is only fair to

out the foreign supply was curtailed and stocks here rapidly diminished so that there threatened a famine in ferromanganese. The result was that the price of the small amount of ferromanganese available jumped to unheard of prices and threatened a shut down of practically every independent steel plant in the country. Shortly after this the American ferromanganese producers came to their rescue and with gradually increasing production the price was brought down to a reasonable war time level and remained there.

In conclusion, if the ferromanganese industry is permitted to survive, by reason of an adequate duty,

	1915	1916	Production of American Ferromanganese—Gross Tons*					Total
			1917	1918	1919	1920	1921	
Lavino Furnace Co.		8,514	32,622	35,421	22,493	59,737	8,382	167,169
E. E. Marshall.....			9,603	32,108	2,249	19,900	None	63,860
American Manganese Mfg. Co.....	10,059	2,892	None	2,293	9,345	9,991	None	34,580
Iroquois Furnace		7,684	19,771	17,312	None	17,329	None	62,096
Total	10,059	19,090	61,996	87,134	34,087	106,957	8,382	327,705

*The table represents the tonnage of ferromanganese produced exclusive of that produced by the United States Steel Corporation and other steel companies, and does not include the production of several other companies which operated during the war but went out of business immediately after the armistice was signed.

say that this tonnage would have been materially increased had the demand been sufficient.

If the steel makers' memory were not so short, and if they would adhere to actual facts we feel sure they would all plead for protection for a ferromanganese industry. Just one illustration: When the war broke

then the steel producers would not be subjected to any undue hardship and the United States—the largest producer of steel in the world—by fostering a ferromanganese industry of its own would not be dependent on foreign countries for its supply of this vitally important element.

DUTY ON HIGH SPEED STEEL

Sheffield Manufacturers Present Their Views to Senate Committee

WASHINGTON, Sept. 6.—Essentially different points of view were apparent when high-speed steel manufacturers from Sheffield, England, through Arthur Balfour of Arthur Balfour & Co., presented their arguments on Tuesday of last week regarding the proposed tariff duties on their products carried in the Fordney bill. The hearing was referred to briefly in THE IRON AGE of Sept. 1, page 568. Naturally enough, they looked at the matter from the angle of producers who are apprehensive lest duties be imposed which would shut off the American market from their trade. While members of the Finance Committee accorded a courteous reception to the British manufacturers, it was evident that they looked at the matter with the domestic situation in mind. The hearing was not only unusual in that it probably marked the first time in the history of American tariff legislation that foreign manufacturers appeared in person to protest proposed rates, but it was significant of the development in the high speed steel industry of the United States and its competitive effect on an old source of supply. It denoted efforts of American manufacturers of tool steel to expand this industry, comparatively new for the United States and the striving of the British producers to maintain the important trade and long association they have had with the United States.

The vital interest which British manufacturers have in the domestic market was made plain when Mr. Balfour told the committee that probably 18 per cent of the output of Sheffield high-speed steel producers is shipped to the United States, and that some firms do practically all of their business with consumers in this country. He stated emphatically that the duties proposed in the Fordney bill would entirely shut off the American trade. He suggested that the proposed duty of 20 per cent ad valorem on steel valued above 40c. per lb. should be reduced to 10 per cent and that the compensating duty of 72c. per lb. on the tungsten and molybdenum content should be reduced to 35c. per lb. He also protested against the American valuation plan, stating that Sheffield makers have running contracts for 200 to 300 tons with American consumers, and that it would not be possible to determine what the prices would be until the duties are levied or known.

The committee, of course, already has approved and

is studying the American valuation plan extensively and is to get further detailed reports from experts of the Treasury Department. But it is obvious that while it discerns difficulties that may arise in putting the plan into effect, it is the attitude of the committee that the present basis of levying duties on the foreign valuation will be virtually impossible of successful operation in the absence of having a very large corps of officials from the Treasury Department stationed in foreign ports throughout the world.

The soundness of the argument made by Mr. Balfour regarding the necessity of trade between the nations and of stabilized exchange was recognized by the committee. But the manner of doing this seemingly represented a difference of opinion, because those members who are desirous of aiding the domestic industry through a protective tariff do not want to sacrifice the interest of United States makers in order to stabilize international currency. Arguments of Mr. Balfour for the necessity of reviving the industry in England were replied to in substance by Senator Smoot by stating that the same thing might be said regarding the industry in the United States. But it was indicated to Mr. Balfour that the committee reciprocated his feelings that it is necessary for England and the United States to maintain business relations and that it is, of course, not desired to unfairly shut out foreign interests from the American market. They sympathized with him in his expressions concerning struggles of the English people to overcome the enormous strain of war.

"All that is asked is to let us live and pay you, because the only thing we can do is to trade goods with you," said Mr. Balfour.

But here again, it was shown that the American people also are under a heavy strain due to the war and that it is necessary to revive domestic industries. Mr. Balfour stated that the cost of melting is 400 per cent higher than it was in 1912 and that the British makers are paying wages which are about the same as those paid in America.

"We do not believe in retaliation in our country," said Mr. Balfour; "we are afraid it would cause mistrust between nations and all we ask is for you to give us what you can."

Mr. Smoot asked Mr. Balfour if he would be satisfied if the tariff made up the difference in the labor cost and equalized the difference in exchange. Mr. Balfour replied that that plan would be satisfactory, provided the so-called high tariff duties were not made permanent.

LOWERED FREIGHT CHARGES

Reduction Made on Iron and Steel Exports— New Pacific Rates Pending

WASHINGTON, Sept. 6. — Following permission granted by the Interstate Commerce Commission to railroad lines east of the Mississippi River, to reestablish export rates on iron and steel products through the Atlantic seaboard ports, amounting to a reduction of a little more than 20 per cent, transcontinental lines have filed an application with the commission asking permission to make reductions in rates on iron and steel products from all producing sections to Pacific coast terminals, the proposed cuts ranging from 25 to 40 per cent. The new application, which applies to all products, from pig iron to finished steel, calls for the establishment of flat rates to the points of destination, regardless of the differentials now obtaining from the nine rate-grouping districts into which the country is divided.

The request, which involves a departure from the so-called long-and-short-haul provision of the act to regulate commerce, is made in order to meet competition through the Panama Canal, though the proposed trans-continental rail rates still will be much higher than those applying to shipments to Pacific coast terminals by way of the canal. The railroads ask that the commission give the matter early consideration, the intention being to apply the reduced rates, if they are allowed to become effective, as soon as possible, and it is believed the permission will be granted to make the new rates operative on or before Oct. 3.

Typical of the present rates and the reduction proposed are those relating to steel bars, hoops, bands and cotton ties. The application seeks to lower rates on these products to \$1 per 100 lb. The present rate from New York is \$1.83½; from Boston \$1.66½; from Pittsburgh and Chicago, \$1.58½; from points west of the Mississippi River to the Missouri River, \$1.50; and from points west of the Missouri River, \$1.25½.

Some of the other major steel products listed in the application, and the proposed new rates, are as follows,

rates stated per 100 lb., unless otherwise specified:

Pig iron, billets, blooms, etc., \$1 west from Atlantic seaboard to Mississippi River and south of the Michigan-Wisconsin line; 90c from all other points. Bolts, nuts, etc., horse shoes, iron sheets and plates, No. 11 or heavier, welded or seamless pipe minimum weight, 60,000 lb.; boiler flues, not over 12 in. in diameter (minimum weight 60,000 lb.); large nails, spikes, etc., light rails and fastenings and angle bars, locomotive axles, wire and wire goods, wire rods and structural steel, \$1.

Corrugated iron sheets, No. 12 and lighter, pipe fittings and connections, \$1.15; rough castings and forgings, boiler flues not over 12 in. in diameter, and welded or seamless tubing (minimum 40,000 lb.); nails and horseshoes in boxes (minimum weight 50,000 lb.), \$1.25; cast iron pipe and connections, \$1 (minimum weight 60,000 lb.), and \$1.25 (minimum weight 40,000 lb.); heavy steel rails \$20 per gross ton, minimum weight 80,000 lb.

Representative of new rates, which become effective today on shipments from Pittsburgh and the Atlantic seaboard for export, are the following, the first column being stated in cents per 100 lb., and the others in dollars per gross ton:

Eastbound Export Rates Effective Sept. 6, 1921

Pittsburgh to—	Special Iron and Steel Articles	Billets	Pig Iron	Rails
New York	28 ½c.	\$4.70	\$4.60	\$4.40
Boston	28 ½c.	4.70	4.60	4.40
Philadelphia	26 ½c.	4.30	4.20	4.20
Baltimore	25 ½c.	4.10	4.00	4.10
Norfolk	33 ½c.	5.50	5.30	4.60
Newport News ...	33 ½c.	5.50	5.30	4.60

The railroads had filed applications to make these rates effective last Thursday, but some of the tariffs were delayed and consequently the reductions did not become operative until today. The lowering of iron and steel freight rates on shipments for export has been well received by the trade, and it is expected that it will prove an element in hastening readjustment and the revival of the industry. At the same time, the trade is anxious that there be a general lowering of rates on purely domestic shipments as well.

TO IMPORT SWEDISH IRON ORES

New Agency at Philadelphia for the Famous Kiruna Product

The Trafikaktiebolaget Grangesberg-Oxelösund of Stockholm, Sweden, operator of the famous Kiruna iron mine and the largest and most important firm of iron ore miners and sellers in Sweden, announces that Albert Broden, Temple, Pa., formerly general manager of blast furnaces of the Reading Iron Co., who has been its representative in this country for the last 16 years, has severed his connections on account of his health.

Park & Williams, Inc., who have offices in Philadelphia and Pittsburgh, have been appointed to succeed Mr. Broden and in the future will look after the sales of this ore in the United States. Laird U. Park, president of Park & Williams, has just returned from a trip to Sweden in the course of which, he visited the various mines operated by the company and also went to Narvik, Norway, to inspect the new crushing plant and the modern steel ore dock, which can load three vessels at one time at the rate of about 2000 tons per hour each. A description of the Narvik ore dock appeared in THE IRON AGE of Jan. 9, 1908.

The Trafikaktiebolaget Grangesberg - Oxelösund mines two-thirds of the total of iron ore produced in Sweden, which in normal times has run up to 7,500,000 tons a year. In addition to mines and railroads it has blast furnaces and controls its own vessels. With vessels under construction the fleet will represent over 200,000 tons.

Operations at the company's Kiirunavaara iron mines in the north of Sweden have been considerably increased, and steam shovels are now at work on a

sufficient number of benches on the outside of the mountain to permit of taking out over 14,000 tons per day. In the past year work on the Luossavaara iron mountain, located a short distance from Kiruna, has progressed until the mining rate is now 1000 tons per day. The ores in these deposits run 60 up to 69 per cent iron, natural, with phosphorus ranging from 0.05 to 3 per cent, the average ore mines carrying from 0.75 to 1.25 per cent of phosphorus.

Lake Iron Ore Shipments in August

Shipments of iron ore from the Lake Superior region in August were very light as compared with those for August, 1920. This year they were 4,329,158 gross tons, which compare with 9,270,763 tons in August 1920. The decrease from last year was therefore, 4,941,805 tons or 53.30 per cent. The totals by ports, with season shipments, and a comparison with 1920, are given below:

	August, 1921	August, 1920	To Sept. 1, 1921	To Sept. 1, 1920
Escanaba	309,111	1,277,561	758,173	4,394,838
Marquette	129,691	602,567	263,105	2,141,291
Ashland	468,283	1,327,294	1,429,308	4,933,402
Superior	917,693	2,266,497	3,508,928	8,961,424
Duluth	1,833,247	2,351,918	6,472,640	9,352,140
Two Harbors ..	671,133	1,444,926	2,315,918	5,566,779
Total	4,329,158	9,270,763	14,748,072	35,349,874

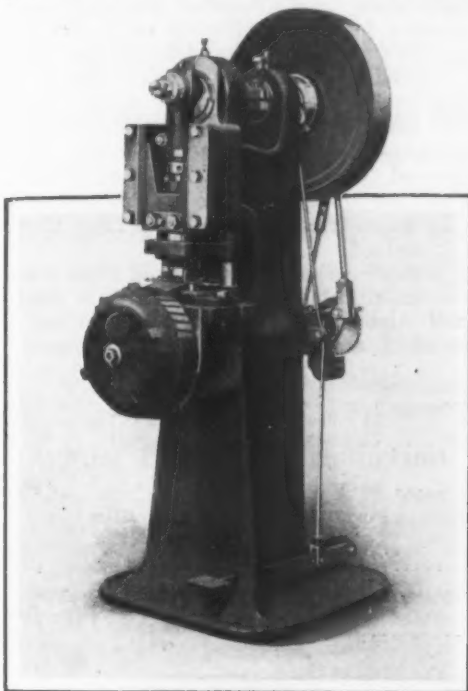
The decrease in season shipments to Sept. 1, 1921, has been 20,601,802 tons, or 58.27 per cent, as compared with an increase for the same period a year ago of 5,751,826 tons.

Of the season's total to Sept. 1, the Great Northern dock contributed only 0.99 per cent, as against 21.63 per cent a year ago. Duluth is credited this year with 43.89 per cent of this season's total as compared with 26.46 per cent a year ago.

Tie-Splicing Machine

A machine designed primarily for splicing short pieces of cotton ties but adaptable to other uses of a similar nature has been brought out by the Renaud Co., Cincinnati. The splices made are double riveted.

The press is of the same design as the ordinary upright press but modified to receive the positive power driven automatic rivet feed. It is operated by a foot lever, its operating features said to have been taken from the Willard power press. The dies are of the combination trimming and piercing type, consisting of a subpress held in adjustment and alignment by heavy guide posts. The lower half of the die is a single piece



The Slots in the Hopper Are Emptied and Refilled During One Revolution

of specially selected stock and has a hole in the center shaped to receive the shearing punch which is also a solid block of the same material. The upper and lower halves of the die are securely fastened to the corresponding halves of the subpress. The punch holes are bushed so that if they become broken or worn they may be replaced. The punches are also removable.

The rivet feed is obtained from the hopper, to be seen in the illustration, which contains the rivets and an auxiliary internal mechanism both of which are positively driven from the crankshaft, there being no chains or gears. The hopper is timed to index one slot at each stroke of the press. As one stroke is required to prepare the tie ends and one stroke to compress the rivets, two rivets are brought to an upright position in front of the operator in time for the next riveting operation. The slots are emptied and refilled during one complete revolution of the hopper, the rivets not used falling back into the hopper and causing no interference.

In splicing, the material is placed between the shear and punch blocks, the pressed tripped, and the pieces are prepared for riveting. The operator then takes one piece, places it over the two rivets standing upright in front of him in the slots, slides it under the hammer, places the other piece on top and then trips the press, compressing the rivets and completing the operation. The production claimed is 1500-2000, 11½ ft. ties per day, the finished splices being uniform and smooth. The machine weighs 1400 lb. net.

A small number of men employed in the drop department, North & Judd Mfg. Co., New Britain, Conn., automobile and carriage hardware, etc., last week walked out following a reduction in wages. Their places were promptly filled at the reduced wage. Wages of employees at this plant have been reduced 5 to 10 per cent.

WEEKLY COMMERCE REPORTS

Department of Commerce to Give Foreign Trade Information by Industries

WASHINGTON, Sept. 6.—Beginning yesterday, *Commerce Reports*, published by the Department of Commerce, became a weekly instead of a daily publication. This change is made as part of the general reorganization plan of the foreign trade service.

Commenting on plans of the Department, Secretary Hoover said:

It is proposed to place information with regard to foreign trade before American business men in more intelligible and constructive form. Heretofore a vast amount of material, which comes in from a staff of 600 foreign agents, including commercial attaches, consular agents, trade commissioners and special agents, has been presented in a daily mass of reports, unsystematized excepting for arrangement to some extent on a purely geographical basis.

The bureau of foreign and domestic commerce is being reorganized on a commodity basis, the object of which is threefold:

1. That specialists in the different great industrial divisions should be incorporated in the bureau for the purpose of giving expert direction to these many foreign agents as to the investigations and services that will be of importance and most useful to their particular branch of industry.

2. That they may, by maintaining close communication with trade associations in different industries, keep in touch with the character of service, information and investigation needed in these industries.

3. That the material coming in may be edited and prepared in such a manner as to be of the most practicable service.

The following divisions have so far been established:

Iron and steel.	Fuels.
Lumber.	Textiles.
Industrial machinery.	Shoes and leather products.
Electrical equipment and supplies.	Agricultural implements and vehicles.
Foodstuffs.	Rubber products.
Automotive equipment.	

The men in charge of these divisions have been chosen from the industries themselves and in most instances have been selected in co-operation with their trade associations so that they may bring to the department not only specialized knowledge and sympathetic understanding of the problems of these particular industrial groups but in turn may interpret to the foreign staff the needs of these industries and, as stated above, develop the material received in such form as may be of the greatest use in the industry to which it is related.

In the above sense the weekly form will be departmentalized over the different industries as far as practicable.

In order that there may be the widest distribution and no delay in important information, special material will be released to the press immediately upon its arrival, in advance of the weekly publication.

The present form of the weekly is not final, and it is anticipated that changes and improvements will be made in succeeding numbers. The department will welcome suggestions and criticisms that will lead to making the *Commerce Reports* in this new form more useful to subscribers.

Steel Employment Slightly Better

WASHINGTON, Sept. 6.—Employment in the iron and steel industry finally has shown an upturn, though slight, according to the Employment Service of the Department of Labor, and made an increase of 6726 workers, or 2.2 per cent, in August when compared with July. The report indicates that 1428 firms, in 14 lines of industry, located in the 65 principal industrial centers, employed 1,510,210 workers on July 31, and the number was increased to 1,526,479 on Aug. 31, a net gain of 16,269 or 1.08 per cent. Industrial classifications showing increases in employment are iron and steel and their products; metals and metal products other than iron and steel; railroad repair shops; tobacco manufactures; food and kindred products; leather and its finished products, and stone, clay and glass products. Among the gains, by numbers and percentages, in addition to iron and steel, were railroad repair shops, 3423, or 5.7 per cent, and metals and metal products, 3877, or 5.4 per cent.

As pointed out by the report, at first glance the figures for August seem to show that the low point in the present severe depression has been reached and passed, and that the country has at last definitely set out on the road to normal conditions.

Of the 38 places reporting increased employment are the following important iron and steel towns, together with the percentages of gain: Youngstown, 27.7 per cent; Cleveland, 10.8 per cent; Johnstown, Pa., and Birmingham, 5.2 per cent; St. Louis, 3.3 per cent, and New York, 2.8 per cent. Pittsburgh, on the other hand, showed a decline of 4.4 per cent in employment in August.

Demand for Machinery in Spain

A review of the immediate and potential demand in Spain for machinery of various classes, coming from the commercial secretary to his Majesty's Embassy at Madrid and given in a recent issue of the *Engineer*, London, is summarized in what follows.

The opening for agricultural machinery is wide. Although Spain is primarily an agricultural country, the Spanish farmer has not kept pace with the times. New business often involves educating the buyer first. The tractor has not yet established itself definitely in Spain and although the market is more of the future than the immediate present, the time is opportune for manufacturers to lay the foundations of business by making their machines known.

The metal working industries have obtained a specially high protection, import duties amounting to between 100 and 250 per cent. In regard to screws and threaded nuts the demand has been supplied hitherto mostly from abroad but it is expected that with the present duties home production will increase.

In the Barcelona district it is expected that water turbines will be required for the numerous power plant projects in process. At present this trade is almost wholly in the hands of Swiss and German manufacturers but it remains to be seen what effect will follow a recent Royal decree obliging future holders of water power concessions to use Spanish machinery whenever possible. Centrifugal pumps are also largely required for irrigation purposes.

In machine tools business is temporarily at a standstill. In the Vigo and Corunna areas screws and files are in large demand, the Spanish product being reported as of very poor quality. In this connection the British Vice-Consul at Corunna is stated to have reported that the Germans in quoting prices to merchants in this district add the following clause: "If these prices are found dear, please make us a counter offer."

There is a demand for machine tools, for both metal and woodworking reported by the Vice-Consul at Castellon. In the carpentering and cabinet-making industries much work is done by hand which could with advantage be done by machinery. The manufacture of house furniture has developed considerably of late years and a large export trade has been established. In order to introduce the machinery, it is stated, manufacturers must send representatives or appoint agents with security of their appointment for a number of years, propaganda confined to sending of catalogs not being likely to lead to business.

The Spaniard, it is remarked, does not readily renew his machinery, and in the Barcelona district, at least, hardly any of the profits made during the war seem to have been invested in new installations. Some of the local textile factories are still using machinery that dates as far back as 1880.

South Africa's First Modern Blast Furnace

A brief description of the first modern blast furnace to be built in South Africa by the Newcastle Iron & Steel, Ltd., Newcastle, Natal, with main offices at Johannesburg, is furnished by the company as follows:

Prior to this another company built two small experimental plants during the war with a capacity of about 10 tons per day, which turned out a few thousand tons of pig iron from local ores, but these have now been closed down. The drawings for this company's new blast furnace were supplied by McClure & Sons, Pittsburgh, the dimensions being 70 ft. high, with bosh 14 ft. 6 in., and three stoves 20 ft. x 80 ft., with a provision for a fourth. Two stoves are completed and a third is in course of erection. There is also an iron and steel foundry being built, 92 ft. x 180 ft., equipped with a 20-ton open-hearth electric crane. A brick plant has also been erected for the manufacture of fire and common bricks and all the bricks required for the plant are being made on the spot.

The iron ores will be taken from the company's own mines in the district and are of a fairly high grade; the Hematite ore running from 60 to 67 per cent metallic iron, 0.03 phosphorus, 0.9 to 5 per cent

silica with sulphur a trace. Our coke runs from 6 per cent to 12 per cent of ash and sulphur 0.6 to 1.2 per cent. The company has also its own coal property two miles from the works, and dross or fine coal suitable for coking is now being supplied at 3s. 6d. per ton at the colliery.

It is proposed later to erect a steel plant for the manufacture of heavy rails. The site of the works consists of 200 acres on the main line about half way between Durban and Johannesburg with a frontage on the Incanda River.

Southern Raw Material Freight Cuts

BIRMINGHAM, Sept. 6.—Raw material rate reductions ordered to become effective on or before Oct. 1 have not been accepted. The state utilities commission which ordered them expects the carriers to comply, but they have not said whether or not they would appeal to the Interstate Commerce Commission. The rates are preferential. Coal and coke are not affected. Most favored furnaces see no more than 30 to 42 cents saving per ton of iron. These are in the 25-mile zone limit. In stone from over 50 miles from furnace the rate is increased.

The following shows new and old rates from mines and quarries to Alabama City, where the Gulf States Steel and Alabama Co. operate furnaces and general schedule of 25 and 50-mile zones:

		Ore	Present Rate	Proposed Rate	Reduction
To Alabama City					
From—					
Shannon	75 miles		\$0.80	\$0.71	8.87 per cent
Steinman	77 miles		0.80	0.71	8.87 per cent
		Stone			
Spencer	64 miles		0.60	0.63	5 per cent*
For Distances Under 25 Miles					
			Present Rate	Proposed Rate	Decrease
Ore			\$0.50	\$0.37	26.0 per cent
Stone			0.40	0.37	7.5 per cent
For Distances 25 Miles and Under 50 Miles					
			Present Rate	Proposed Rate	Decrease
Ore			\$0.60	\$0.47	21.7 per cent
Stone			0.50	0.47	6.0 per cent

*Increase.

Southeastern Fabricating-in-Transit Privilege

BIRMINGHAM, Sept. 5.—Premature report from Atlanta last week was to effect that the Southeastern freight rate committee had approved the recommendation of Southern and Louisville & Nashville railroads for a fabricating in transit privilege on iron and steel products in Birmingham, Atlanta, Chattanooga and other Southeastern points. The committee took the matter under advisement according to custom. It is confidently expected that the action will be favorable, but no decision has been announced.

Plans for the reorganization of the Nickel Alloys Co., Clearfield, Pa., with plant at Hyde, near Clearfield, are under way, with proposal to form a \$2,500,000 company and take over the assets of the present organization, which has been in the hands of a receiver for several months. William J. Webster and Leland Lyon are at the head of the reorganization committee; bonds for \$1,000,000 will be issued to carry out the details and place the plant, now closed, in operation.

The American Steel Foundries, Chicago, according to a statement by its president, has no money borrowed from any source, and on the other hand, has \$2,000,000 in cash, and over \$4,500,000 invested in securities, mostly Liberty bonds and certificates of indebtedness. Surplus is over \$10,000,000 and inventory has gone down \$2,000,000 since the first of the year, although it was low at that time.

The Philippine district office of the United States Bureau of Foreign and Domestic Commerce, was opened in Manila, July 15, with temporary quarters in the Ayuntamiento, the executive building of the Insular Government. The office, in charge of George L. Logan, manager, purposes to cooperate with American business houses.

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Benefits of Export Trade

Apparently there is a clash between those who hold that to be prosperous the United States needs an export trade and those who contend that payment for the goods exported would bring us fresh trouble. On the one hand it has been argued that we have an excess of productive capacity, hence must have an "outlet" or be but indifferently employed, while on the other hand it has been urged that a large "favorable balance" in merchandise trade is calculated to produce a price inflation that will kill the business.

The more moderate view in favor of our doing an export business is that thereby our various markets are broadened and correspondingly stabilized. We have the same principle in the domestic market. The seller who distributes his goods widely over the country has a steadier market than the one whose trade is local. When domestic demand for a given commodity is good we can export less, and when the demand falls off we may be able to export more. Obviously that is altogether different from an attempt to export all goods when all demand is light in our own country. We know well enough now that as a rule such thing cannot be done. When demand in general is poor in the United States it is likely to be poor practically everywhere.

The question has often been asked, what is the relative quantitative importance of our domestic and our export trade. The Federal Reserve Board has given the matter careful consideration and expresses the opinion that, very roughly, a normal export trade may be taken at 10 per cent of the whole. The board (in the August Bulletin) arrives at this by taking 1919, with a census estimate of \$62,589,000,000 for all manufactured products and \$16,013,000,000 for all crops, or a total of \$78,602,000,000, while the exports were \$7,920,000,000. The board points out that export trade has a stabilizing influence upon prices, because a small excess or a small deficiency in supplies may have a great effect upon the market price.

Obviously this is a totally different thing from planning definitely to export a certain percentage

of each of a large number of products and then endeavoring to maintain that percentage, whether demand is good or bad at home or good or bad in the foreign market. It is distinctly the flexibility that is an advantage, and to endeavor to maintain a fixed percentage would be to renounce that advantage entirely.

Again, we should not seek to prevent importations. Tariffs are for the purpose of raising revenue and taking care of unevenness and divergence in legitimate costs of production here and abroad. The individual sells goods in order that he may buy other goods and as a nation we should do the same thing, within proper limits and with proper regulation.

Almost constantly since the armistice questions have been asked relative to the continuance of heavy exports as compared with much lighter imports. The favorable balance in merchandise trade rose to \$635,463,660 in June, 1919, its high record, and then declined to \$65,501,992 in July, 1920; but that was not the end, for the balance rose again to \$454,379,696 in December, 1920, and the figures have given no clear indication of what we ought to expect. The Federal Reserve Board now gives an interesting fact bearing on this question. On the assumption, generally believed to be substantially correct, that there was an even break at the time of the armistice, it was computed that the unfunded balance resulting from our foreign trade amounted to \$3,000,000,000 on July 1, 1920, and that this increased in the next fiscal year by \$1,500,000,000, making about \$4,500,000,000 on July 1, 1921.

Details of German steel exports for 1920 are published in the latest issue of *Stahl und Eisen* to reach this country, that for Aug. 11. They are interesting as giving some measure of the activity of the German steel industry as a whole despite the fact that production data are not yet made public. The 1920 exports were 1,750,601 metric tons, or 145,900 tons per month. This is about 30 per cent of the average of 1912 and 1913 exports which was 468,000 tons per month. For the last two months of 1920 the figures were 176,480

tons and 182,120 tons, respectively, or considerably above the year's average. Structural steel, plates and sheets, rails and pig iron in the order named constituted the principal exports, structural steel running about 25 per cent of the total and plates and sheets 13 per cent. Exports of rails at 152,016 tons exceeded British rail exports, which were 134,400 tons and Germany exported more structural steel than Great Britain, as well as more hoops and strips. It is noteworthy that Germany last year exported more than the combined steel exports of Belgium and France and that the total was more than 50 per cent of that for Great Britain.

Prices and Buying Power

In the early part of the industrial depression that began in 1873, and quite similarly in the case of the depression that began in 1893, the opinion expressed by some very able and intelligent observers was that the country was overdeveloped. Too many factories had been built, too many mines opened and too much railroad mileage constructed. Business was poor because there was not sufficient employment for the facilities.

The idea was not that the employment was deficient, but that the facilities were in excess; just as it might be said of human employment that there were too many men, not that there were too few jobs. In each case the sequel showed that such analysis was wrong. The fault did not lie with the productive facilities, for afterward when activity returned there was much further development, and the greatly increased facilities all found employment eventually.

Little was said in those days about prices being too high. Possibly they were somewhat higher than would have been well, but the decline that followed did not bring about activity. Unemployment had intervened and the buying power was so reduced that men found it impossible to buy freely. The decrease in the total of purchasing power was greater than the decrease in unit prices.

Of late a great deal has been said about commodity prices being too high. No doubt the mental attitude of many buyers was that of assigning the level of prices as a reason for abstention from buying, but it does not follow that this was the main reason. It would be absurd to assume that an economic law can be deduced from what chances to be in men's minds.

Inasmuch as prices needed to come down it was well to have sellers appreciate that buyers were objecting to them. Now, however, we have progressed to another stage. We shall be in error if we adhere blindly to the idea that activity was, is and will be absent through one cause only, that of prices being too high. If a man is guided solely by such philosophy he can have but one view—that as long as inactivity obtains prices are too high, no matter what those prices are.

The buying power is greatly reduced. There is much unemployment and with nearly all those still in employment the wage or salary rate is lower. The earnings of capital, which normally are reinvested, have dwindled greatly and many companies have seen profits turned into losses.

For business revival the main point is the building up of buying power, obviously a slow process. An argument frequently made is in substance that capitalists must pull business over the dead center, by seeking investment in construction work. That would distribute some jobs, wages would be paid and the wages could be spent. This would bring about more spending, and so on. The plain difficulty about this is that with the general buying power at a low level capital would not see prospect of an early return on the investment, and therefore would be disposed to wait until the buying power was clearly increasing. That the capitalist does not invest is not conclusive proof that he thinks prices are still too high. He may, for all one knows to the contrary, be satisfied with the prices, but entirely dissatisfied with the immediate prospects for the investment.

The Inventor's Opportunity

The patent lawyers of the country are very busy. This almost always is the case in periods of depression following very brisk business, but this year the condition is even more marked than usual. A chief reason is the desire of manufacturers to secure new products for which there would be a quick demand, and in this way put to work men and machinery that otherwise would be idle. Consequently it is an advantageous time for the inventor who has something worth selling, providing he will listen to a reasonable proposition of purchase.

The war years gave little opportunity for the development of new ideas having to do with peacetime purposes. In the hectic months that followed most industries were too busy supplying their established products to give serious attention to changing them or adding to them, except, of course, that the draughting rooms turned their attention from war to peace. With the falling off in industry, managing officials began to look forward, first to the immediate future, in the effort to maintain the production of their plants, and then to the farther future, getting ready for the return of good times, lest their competitors might steal a march on them.

The patent attorney's clients who are inventors pure and simple and not producers, can profit by the present situation, if they have useful patents or patentable ideas, for the attorneys constantly get requests from manufacturers for information pertaining to new products. Some of the machine tool makers are seeking new lines, not necessarily machine tools or mechanisms which go with them. They want something that will sell in a time when machine tool buyers are few—something requiring in its manufacture the precision work for which their shops are equipped. Not all such products will be permanent lines, yet some of them may continue as departments when machine tools again are in strong demand, at any rate until they can be sold to advantage.

Inventors change little in one respect—their inability to gauge fairly the money value of their ideas. Occasionally they are too modest, but more often they are visionary in their anticipa-

tion of wealth, wanting tens of thousands where a correct measure would be thousands or even hundreds. Few inventions have a real commercial value until they have been put through a costly developing and refining process, and for that the lawyer must pay.

The reputable attorney endeavors to give sound advice to his clients as to patent values, a common suggestion being something down in cash and a royalty based on a minimum annual production, thus insuring against the invention being put aside or produced in such small quantities that royalties would amount to little. A good test of an inventor's faith in his claims is his willingness to accept, through a sale on the royalty basis, a share of the risk of a disappointing demand. The inventor should be willing to back his claim, if necessary, by accepting, through a sale on the royalty basis, a share of the risk of a disappointing demand in the market.

On the Will to Work

The addresses made last week before the American Bar Association in Cincinnati by Attorney General Daugherty and by James M. Beck, Solicitor General, dealt with matters of the highest importance to the nation. They should set many men to thinking, and thinking is sorely needed in this country to-day.

Attorney General Daugherty talked very plainly and vigorously. He planted himself firmly on the platform of law enforcement, saying that as a citizen cannot choose what laws he will obey, so those charged with law enforcement cannot choose what laws they will enforce. The chief interest in the address was in the disclosure that the new Attorney General not only appreciates time-honored doctrine as to the enforcement of the law, but also knows how to apply that doctrine to present-day conditions. He made it perfectly clear that he is not for one minute deceived by those who are disseminating propaganda to dignify crimes committed during the war by disloyal men, nor is he led astray by the attempts of some business men and some labor leaders to evade the law, or by others who under pleas of personal liberty are anxious to see certain laws violated or debated.

Mr. Beck's address discussed present conditions without fear or favor. He spoke in detail of each of the five plagues which Pope Benedict has said afflict humanity: the unprecedented challenge to authority, the equally unprecedented hatred between man and man, the abnormal aversion to work, the excessive thirst for pleasure as the great aim of life, and the gross materialism which denies the reality of the spiritual in human life. We can refer only briefly to one of these plagues as commented upon by Mr. Beck—the aversion to work:

The great evil of the world to-day is this aversion to work. As the mechanical era diminished the element of physical exertion in work, we would have supposed that man would have sought expression for his physical faculties in other ways. On the contrary, the whole history of the mechanical era is a persistent struggle for more pay and shorter hours, and to-day it has culminated in world-wide ruin; for there is not a nation in civilization which is not now in the throes of economic distress, and many of them

are on the verge of ruin. In my judgment, the economic catastrophe of 1921 is far greater than the politico-military catastrophe of 1914.

Mr. Beck went on to show that the statistics as to productive industry, particularly the loss of time due to strikes, are literally appalling. Even in Germany, where men are said to be working more generally than in most European countries, 46,600,000 working days were lost in strikes in 1919. In the State of New York alone in 1920 there was a loss due to strikes of over 10,000,000 working days.

Trying to explain the conditions he described, Mr. Beck declared that the present weariness and lassitude of human spirit and the disappointment and disillusion as to the aftermath of the war may have aggravated but they could not cause the symptoms of which he spoke. He knew of but one change in environment that is sufficiently widespread and deep-seated to account adequately for this malady of our time. He referred to the mechanical developments of steam, the gas engine and electricity, and said that in acquiring from the forces of nature almost illimitable power, man has minimized the necessity for his own physical exertion or even mental skill. A machine now not only acts for him, but almost thinks for him. In other words, a man who has had so much done for him by machinery is like the pampered child who cries for more to be done for him and is not willing to do anything for himself.

Perhaps Mr. Beck has loaded too much of our present ills upon the aversion to work which has been recognized as a world-wide malady following in the wake of the war and for much of which time will be the cure. But there will be no dissent from his plea for the rekindling in men of the love of work and for a new development of the spirit of individualism and of the spirit of discipline. In less academic phrase Vice-President Coolidge has just urged upon the country the obligation to "pay out and work out" of the burdens imposed by the war.

As we penetrate further into the period of industrial readjustment, legislative cures of one sort and another will be proposed, and there will be an increasing tendency to blame those in authority for delays in the return of prosperity. Such criticism, while largely symptomatic of the tendency to depend on laws instead of individual effort, may have its uses in sharpening discussion of the real causes at work, just as the two notable addresses at Cincinnati have done.

Data on wages and employment in the British steel industry are being published by the National Federation of Iron and Steel Manufacturers. Taking June, 1920, as 100 per cent, wages had fallen in May of this year to 65 per cent of the June, 1920, rate, the peak having been 107 per cent in September, 1920. Employment at the end of the same month, however, had fallen to 14.2 per cent of that prevailing in June, 1920, the peak having been also in September, 1920, at 101.9 per cent. The coal strike, of course, was the major cause of this slump. The interesting statement is also made that, taking the paid-up capital at the end of each

month as 100, the market value of the ordinary shares of 39 British iron and steel companies on Dec. 31, 1919, was 149.7, but by June 30, 1921, it had fallen to 97.1. The increases in capital are stated to have been only genuine additions due to extensions and amalgamations.

CORRESPONDENCE

Titanium-Treated Rails and Split-Head Failures

To the Editor: In connection with the admirable article beginning on page 393 of your issue of Aug. 18, where split-head failures of rails are discussed, may I call attention to the fact that practically seamless steel is available for rails through the simple expedient of thorough deoxidation by titanium treatment? Mr. Howard, in the article in question, mentions the probability that split heads would be unknown if this were the case and he evidently refers to internal seams in the head of a rail and not to surface seams in the flange in this statement.

Data have been accumulating for years in this laboratory showing that steel, properly treated with titanium produces rails practically free from internal seams, in decided contrast to nearly all A-rails of ordinary, untreated steel, and lately the conclusion of our tests has been reached from the service results of the rails in track, where the titanium-treated rails have shown less than half as many failures as the normal number. Mr. Howard's idea that fewer failures would result from the use of homogeneous steel is thus very strongly substantiated by this showing.

The report under discussion describes an accident, resulting in loss of life, due directly to the use in track of a segregated rail that developed a split head. A simple way has been known for years, through our researches and investigations, for practically eliminating the particular defect which causes this type of failure. This method consists merely in adding 0.10 per cent of titanium in the form of ferrocabontitanium to the steel as the last addition in the ladle and allowing at least 10 min. for the reaction to be completed before any ingots are poured. Silicon or aluminum will also deoxidize or "kill" the steel completely but at the risk of producing streaks of non-metallic inclusions, while by the method noted both deoxidation and cleanness are secured.

What excuse is there for the railroads to continue to accept and place in their tracks rails that are not free from this defect of segregation when the preventive for it or insurance against it is so simple, inexpensive, and well known? It is to be hoped that this excellent report by Mr. Howard will be effective in calling attention to this matter so strongly that those who have the authority will see that the traveling public and railroad employees are no longer needlessly exposed to the danger of split-head rail failures which are so readily controlled by attention to the quality of steel used.

GEO. F. COMSTOCK,
METALLURGICAL ENGINEER.

TITANIUM ALLOY MFG. CO.,
NIAGARA FALLS, N. Y.
Aug. 26.

Latin American Criticism of United States Practices

To the Editor: In your issue of May 19, on page 1340, there is an article entitled "South American Prospects." I would like to refer to the paragraph wherein the statement is made that: "There is a feeling in South America that has been promulgated by European exporters and propagandists, that American exporters, after selling them goods, worked some kind of chicanery to change the rate of exchange and make them pay double for their goods, and it will take a long campaign of education to convince the South Americans that the Americans are in no way responsible for the present low rate of exchange."

The exchange question to which the writer of the

above mentioned lines refers, although of recent discovery in the States, is as old as Latin American business, and to say that merchants believe that our exporters can influence it one way or the other, except in so far as it is influenced by our sales or purchases, is to accuse them of ignorance of one of the most important points of their business.

As a matter of fact, every importer in Latin America and every man in business in Latin America is acquainted with the fluctuations in the exchange of half a dozen countries. Take, for instance, any merchant importer. He buys in the States in dollars; in England in sterling; in France in francs and in Germany in marks. He has to pay his bills with drafts in these different moneys or the equivalent in his own currency. Furthermore he will have to meet import duties in the manner indicated by his Government, part in gold, part in currency and, possibly, part in drafts in foreign exchange. He, therefore, must know something about exchange and what influences it, since he is really doing business in various values, purchasing in foreign money and selling in the currency of his country.

However, there is a feeling in Latin America, unfavorable to our trade, fostered by European exporters and propaganda, but it can be charged against the short-sighted policy of some of our exporters and the failure on their part to appreciate foreign conditions.

Exporters who do not ship within the period promised when offering goods; who do not comply with shipping instructions; who substitute color, quality or size of articles ordered; who supply inferior goods; who refuse to allow just claims; who insist on cash with order when dealing with long established firms of unquestionable standing: these are responsible for a great deal of the ill feeling at present prevalent and supply the "talking points" for our competitors.

Trading with Latin America is going to be increasingly difficult, even for old established exporters, because buyers, so often deceived in recent years on the quality of our goods and angered by the treatment they have received, are again turning to European manufacturers and exporters.

X.X.X.

Santiago, Chile, Aug. 1.

American Exports to Russia

Figures from the Bureau of Foreign and Domestic Commerce, Washington, show the extent of the erstwhile market which the United States had in Russia, compared with its present amount. They picture something of what may again be required by that country, once a stable government is set up and buying power re-established by general resumption of productive effort. The items of iron and steel products, as well as other metal products, and the grand totals of all products shipped to Russia by both seaboard, in the calendar years 1915 to 1920 and in the first six months of 1921, are shown in the following table:

United States Exports to Russia (European and Asiatic)

	(Thousands of Dollars, in Calendar Years)				
	1915	1916	1917	A	1921*
Agricultural implements	\$349	\$786	\$6,120	\$264	\$192
Automobiles	24,503	13,793	4,678	140	29
Brass and manufactures	156	3,265	4,293	3	4
Copper, refined ingots, bars, etc.	6,165	14,513	19,148	..	..
Explosives	27,094	223,184	225,953	5,076	29
Firearms	3,056	16,797	55,859	5,585	18
Freight cars	8,018	12,106	2,027	551	..
Lead	1,392	3,352	2,755	27	2
Locomotives	7,440	3,727	11,281	1,862	25
Metal-working machinery	5,883	17,888	7,259	147	1
Nickel and nickel oxide	1,877	3,478	65	..	..
Railway track material	6,939	4,407	5,865	601	..
Sewing machines	229	69	1	..	18
Structural iron and steel	195	68	86	..	..
Typewriters	833	891	236	19	3
Tinplate,terne plate, etc.	374	334	119	8	..
Wire	8,438	13,919	2,449	6	1
Zinc spelter	2,934	3,342	3,024	..	..
Total exports†	\$170,232	\$470,508	\$424,510	\$42,800	\$12,603

*First six months. †Including many items not listed. A is average of 1918, 1919 and 1920.

GAIN IN IRON OUTPUT

August Production 2891 Tons Per Day Larger Than in July

Net Gain of One Furnace with Others to Blow in Soon

Returns of the output of blast furnaces in August indicate a turn for the better. While still very low, the total output was nearly 3000 tons per day larger than in July and for the first time in 11 months there has been a gain in furnaces blown in over those blown out.

The production of coke and anthracite furnaces for the 31 days amounted to 954,193 gross tons, or 30,780 tons per day, as compared with 864,555 tons or 27,889 tons per day in July. Apart from July, no lower production was made since January, 1904, when the total was 921,231 tons or 29,717 tons per day. In August, 1920, the output was 3,147,402 tons or 101,529 tons per day.

The total number of furnaces in blast on Sept. 1 was 70, as compared with 69 on Aug. 1, with 76 on July 1 and with 201 on Jan. 1. The 70 furnaces in blast on Sept. 1 had a capacity of 30,770 tons per day, as compared with 28,175 tons per day for the 69 furnaces on Aug. 1. In the case of several furnaces there was a distinct gain in operating rate in August as compared with July. Seven furnaces were blown out or banked in July and eight blown in, making the net gain for the month one furnace, as compared with a net loss of 250 furnaces in the 10 months preceding August.

The August output of ferromanganese and spiegel-eisen was 3878 tons, as compared with 5524 tons in July. The August output was all ferromanganese, as against only 1509 tons in July.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from August, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons			
1920	Steel Works	Merchant	Total
August	72,740	28,789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,135	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889
August	26,037	4,743	30,780

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons							
	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94,473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	39,768
May	73,015	108,422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107,820	110,354	78,340	98,931	27,889
Aug.	89,666	103,246	104,772	109,341	88,496	101,529	30,780
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	...
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	...
Nov.	101,244	110,394	106,859	111,802	79,745	97,830	...
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	...

Among the furnaces blown in during August were the following:

One Harriet furnace in the Buffalo district; one furnace of the Cambria Steel Co. in western Pennsylvania; No. 4 Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; Nos. 1 and 2 Gary furnaces of the Illinois Steel Co. and one Calumet furnace in the Chicago district and No. 3 Woodward furnace of the Woodward Iron Co. in Alabama. One furnace of the Columbus works of the American Rolling Mill Co. blew in Sept. 1.

Among the furnaces blown out or banked during August were the following:

No. 4 Carrie furnace of the Carnegie Steel Co. in the Pittsburgh district; Nos. 3 and 11 Gary furnaces of the

Illinois Steel Co. and No. 3 Iroquois furnace in the Chicago district and the furnace of the St. Louis Coke and Chemical Co. at Granite City, Ill., and the last two furnaces of the Colorado Fuel & Iron Co. in Colorado.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegel-eisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegel-eisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons			
	Total Production		
	1919	1920	1921
Jan.	2,430,022	2,232,455	1,932,159
Feb.	2,209,470	2,181,679	1,625,695
Mar.	2,277,507	2,480,668	1,323,443
Apr.	1,838,677	1,968,542	1,015,621
May	1,586,805	1,128,720	1,024,678
June	1,655,944	2,209,770	883,312
July	1,906,604	2,230,567	715,664
Aug.	2,108,566	2,254,943	807,144
Sept.	1,828,613	2,247,250	...
Oct.	1,295,690	2,393,644	...
Nov.	1,727,656	2,150,075	...
Dec.	1,916,249	2,047,167	...

Output by Districts

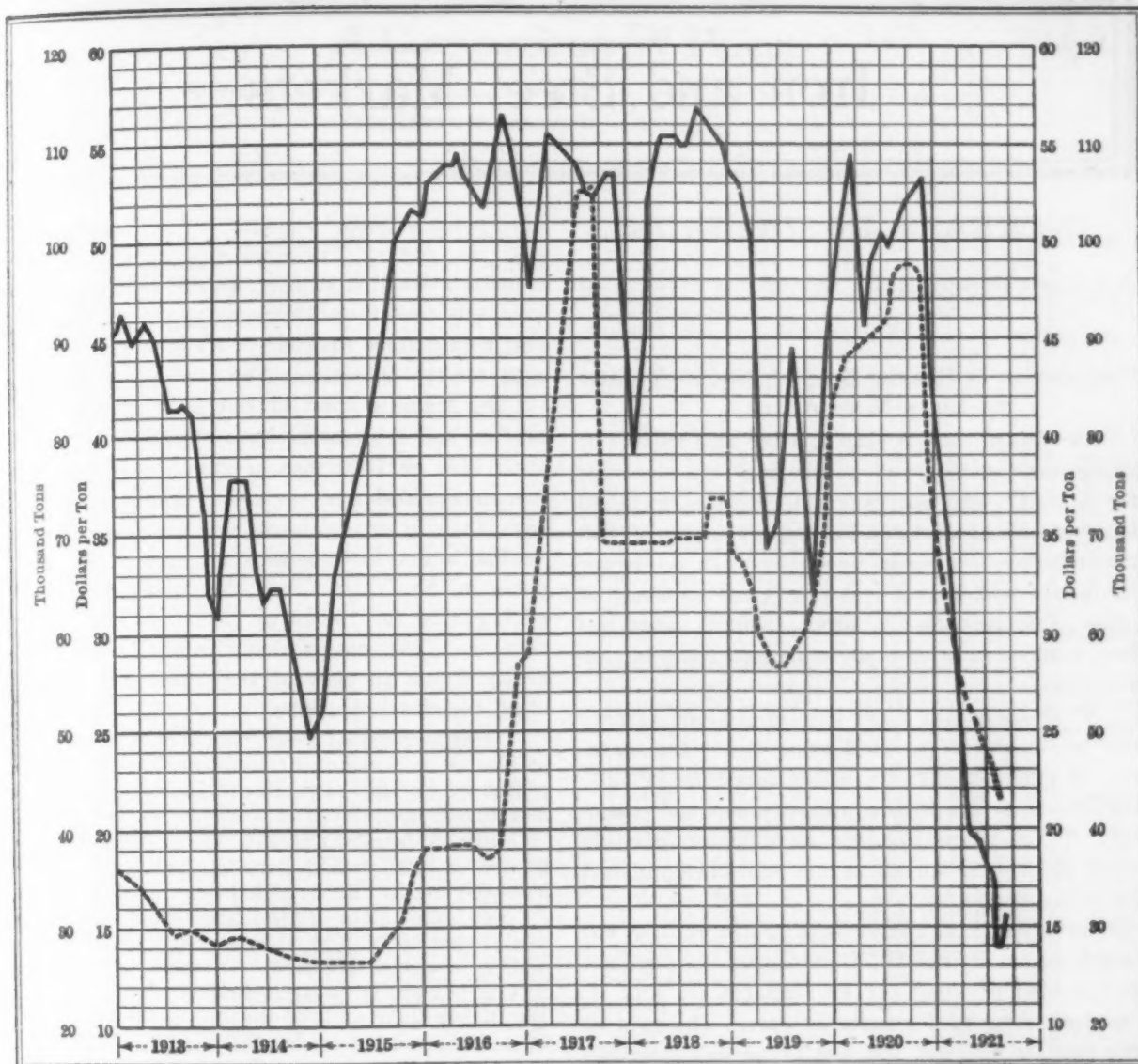
The accompanying table gives the production of all coke and anthracite furnaces for August, and the three months preceding:

Pig Iron Production by Districts, Gross Tons				
	August (31 days)	July (31 days)	June (30 days)	May (31 days)
New York	44,948	34,407	34,241	37,202
New Jersey	4,689	5,554	6,051	10,291
Lehigh Valley	33,014	24,059	29,929	42,289
Schuylkill Valley	20,735	19,210	21,172	24,471
Lower Susquehanna and Lebanon Val- leys	23,939	20,401	25,809	26,491
Pittsburgh district	255,274	185,643	243,025	281,391
Shenango Valley	none	none	12,077	27,981
Western Penna.	47,565	47,680	63,802	73,661
Maryland, Virginia and Kentucky	15,470	14,201	15,289	20,781
Wheeling district	18,076	16,167	18,207	17,981
Mahoning Valley	111,722	92,305	88,515	87,090
Central and North- ern Ohio	83,552	80,150	116,003	133,801
Southern Ohio	3,548	6,266	25,798	29,103
Illinois and Indiana	191,658	201,175	214,834	249,671
Mich., Minn., Mo., Wis., Co. and Wash.	27,304	50,764	56,857	65,004
Alabama	72,699	66,573	93,224	94,013
Tennessee	none	none	none	none
Total	954,193	864,555	1,064,833	1,221,221

Capacities in Blast Sept. 1

The following table shows the number of furnaces in blast Sept. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Aug. 1:

Coke and Anthracite Furnaces in Blast				
Location of Furnaces	Total Stacks	Sept. 1		Aug. 1
		In Blast	Capacity per Day	
New York:				
Buffalo	22	4	1,450	3
Other New York	4	0	...	0
New Jersey	4	1	150	1
Pennsylvania:				
Lehigh Valley	18	2	1,065	2
Spiegel	2	0	...	0
Schuylkill Valley	15	2	670	2
Lower Susquehanna	10	1	430	1
Lebanon Valley	8	2	345	2
Ferro	2	0	...	0
Pittsburgh District	55	16	7,750	17
Ferro and spiegel	4	1	125	1
Shenango Valley	19	0	...	0
Western Penn.	26	5	1,950	4
Maryland	6	1	400	1
Wheeling District	15	1	580	1
Ohio:				
Mahoning Valley	27	8	3,960	7
Central and Northern	26	6	2,950	5
Southern	16	1	115	1
Illinois and Indiana	42	11	5,900	12
Mich., Wis. and Minn.	11	1	485	1
Colorado and Missouri	6	0	...	2
The South:				
Virginia	16	1	100	1
Kentucky	7	0	...	0
Alabama	41	6	2,345	5
Tenn., Ga. and Texas	16	0	...	0
Total	418	70	30,770	69



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302,260	3,015,181	2,416,292
Feb.	2,645,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
Apr.	3,334,960	3,288,211	2,478,218	2,739,797	1,193,041
May.	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
June.	3,270,055	3,323,791	2,114,863	3,043,540	1,064,833
July.	3,342,438	3,420,988	2,428,541	3,067,043	864,555
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	954,193
8 mos.	25,660,277	24,813,145	21,205,737	24,353,431	11,246,914
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	.....
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	.....
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Total.	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.

Blast Furnace Notes

One of the four furnaces of the Rogers-Brown Iron Co., Buffalo, was blown in this week.

It is expected that Tuscaloosa furnace of the Central Iron & Coal Co., at Holt, Ala., will be blown in next week.

In the Shenango Valley the furnace of the Valley Mould & Iron Corporation, Sharpsville, Pa., and one furnace of the Shenango Furnace Co., also at Sharpsville, are scheduled for resumption in the coming week.

The Kalman Co., fabricating interest of Chicago, is preparing to proceed with construction of a plant at Youngstown, Ohio, to supply reinforcing material to its Eastern trade. Work of building a 1500-ft. railroad switch to connect the company's property on Poland Avenue in Youngstown with the Pennsylvania railroad has been started. The first unit will be a modern factory building 60 x 422 ft., and will be the first of three to be erected.

The Triumph Electric Co., Cincinnati, for nearly 30 years manufacturer of 40 deg. Triumph polyphase induction and direct current motors, has been forced to move its Philadelphia office to larger quarters, which are at 709 Arch Street. This territory is under the direction of Arthur H. Allen, district manager.

Iron and Steel Markets

INCREASE IN PIG IRON

August Production Shows a Gain of 90,000 Tons

Competition in Heavier Steel Products—Lighter Lines More Active

An upward turn in output, after nine months of steady decline, is shown in the pig iron statistics for August. The total was 954,193 tons, or 30,780 tons per day, against 864,555 tons in July, or 27,889 tons per day. Taken in connection with the larger buying of mid-August and the firmer tendency of prices, this increase in output confirms what has been said recently of a slight improvement in consumption.

While there was a net gain of but one furnace last month, the larger yield being due to the operation of many stacks at a better rate than in July, the outlook is for further improvement in September. Seven more furnaces have either gone in since the month opened or are scheduled to start up before Sept. 15.

The capacity of the 70 furnaces in blast as the month came in was 30,770 tons per day against 28,175 tons per day for 69 furnaces on Aug. 1, based on their performance in July. The gain of one furnace followed the loss of no less than 250 furnaces from the active list in the preceding nine months.

The slight upturn from the long decline in pig iron prices made consumers cautious. Buying has been less active in the past fortnight; at the same time considerable inquiry is up and the balance between supply and demand is being closely watched in view of the starting up of a furnace here and there.

In finished steel the rate of mill operations has not changed, yet there are not a few reports of better business in August than in July. Competition is rather sharper in the heavier products—plates, shapes and bars—and prices are more commonly 1.65c. and 1.70c. In the Chicago district a number of late transactions would figure out considerably lower if reduced to the Pittsburgh base.

In the Central West inquiries for 7000 tons of tank work are up, in addition to the 17,000 tons recently reported for Mexico.

Interest is being taken by pipe makers in the proposed 90-mile line, which Wyoming producing and refining companies may build, requiring 8000 tons. Manufacturers of iron pipe announced a reduction of \$10 to \$12 per ton effective Sept. 1, the fourth reduction since the opening of the year.

The lighter products, sheets, tin plate and wire,

have made a better showing in the orders of the past two weeks. The leading sheet and tin plate interest showed a gain of 45 per cent last month over July orders and shipments, August being the best month since February. Its schedule this week calls for the operation of 50 per cent of its mills.

The Masonic hotel project in Detroit has been revived and fabricators have been asked to revise their bids on 7000 tons of steel. Pittsburgh has more structural work in sight, chiefly large buildings, than in several months.

The plans for starting up several blast furnaces in the Central West have brought a number of inquiries for 10,000 to 15,000-ton lots of Lake iron ore. The coke market also has grown considerably firmer in view of the expected increase in blast furnace operations.

Demand for tool steel, which is a reliable barometer of operations in metal-working shops, has picked up of late. Orders are coming from widely distributed sources after many weeks of dullness.

German ferromanganese, 76 to 80 per cent, is quoted at 4930 marks per ton, Baltimore, or considerably below the British price of \$65, seaboard.

New cuts in the British steel market, as Continental prices stiffen, have given British steel makers a better position. German producers are no longer quoting on semi-finished steel, having orders filling their mills to the end of the year. There is an improved tone in the British market and greater activity is expected.

Pittsburgh

PITTSBURGH, Sept. 6.

Fundamental conditions in iron and steel show no particular change as compared with those of a week ago. The disposition of buyers to confine purchases to actual needs still is quite marked and only in spots are orders at all numerous. In the heavy tonnage products not much is doing, but there is a rather good business in sheets and tin plates, at least as far as the American Sheet & Tin Plate Co. is concerned, while jobbers and consumers are pretty persistent buyers of the wire products, notably nails. The American Sheet & Tin Plate Co. reports the past week to have been the best of any in several months in sheet orders and shipments and that the month of August showed a gain of 45 per cent over July and was the best month the company has had since last February. Its schedule for this week calls for the operation of 50 per cent of its sheet mills. This company also has been enjoying a brisk business in prompt shipment orders for tin plate and has under power 50 per cent of its mills. This is a clear gain of 10 per cent in a week and compares with an operating rate of less than 25 per cent only three weeks ago.

Another fairly bright spot in the situation is the fact that prospective structural business involves several good-sized tonnages which, it is believed, will be placed in the near future. Bids are to be opened Sept. 9 by Pittsburgh for the construction of the ramp for the Boulevard of the Allies which will take 1500 tons of steel, while the general contract for a 9-story addition to the present 11-story building of the Bell Telephone Co. in Pittsburgh and the construction of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 6, 1921	Aug. 30, 1921	Aug. 9, 1921	Sept. 7, 1920
No. 2X, Philadelphia...	\$20.84	\$20.84	\$19.84	\$53.51
No. 2, Valley furnace...	21.00	21.00	19.50	50.00
No. 2, Southern, Cin'tif...	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala. f...	19.00	19.00	19.00	42.00
No. 2, foundry, Chicago*	21.00	21.00	18.25	46.00
Basic, del'd, eastern Pa...	19.00	19.00	20.26	51.26
Basic, Valley furnace...	19.00	19.00	18.00	48.50
Bessemer, Pittsburgh...	21.96	21.96	21.96	50.46
Malleable, Chicago*	21.00	21.00	18.50	46.50
Malleable, Valley...	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh...	21.96	21.96	21.46	50.96
L. S. charcoal, Chicago...	33.50	33.50	33.50	58.50
Ferromanganese, del'd...	70.00	70.00	70.00	170.00

Rails, Billets, etc., Per Gross Ton:	Sept. 6, 1921	Aug. 30, 1921	Aug. 9, 1921	Sept. 7, 1920
Bess. rails, heavy, at mill...	\$45.00	\$45.00	\$45.00	\$55.00
O-h. rails, heavy, at mill...	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh...	29.00	29.00	30.00	60.00
O-h. billets, Pittsburgh...	29.00	29.00	30.00	60.00
O-h. sheet bars, P'gh...	30.00	30.00	32.00	68.00
Forging billets, base, P'gh...	34.00	34.00	35.00	75.00
O-h. billets, Phila...	35.74	35.74	35.74	65.74
Wire rods, Pittsburgh...	38.00	40.00	42.00	75.00
Skelp, gr. steel, P'gh, lb...	1.70	1.75	1.75	3.25

Finished Iron and Steel,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philade'phia...	2.00	2.00	2.05	4.85	
Iron bars, Chicago...	1.75	1.75	1.75	3.75	
Steel bars, Pittsburgh...	1.65	1.70	1.75	3.25	
Steel bars, Chicago...	1.85	1.88	2.03	3.63	
Steel bars, New York...	2.03	2.08	2.13	4.13	
Tank plates, Pittsburgh...	1.70	1.70	1.80	3.25	
Tank plates, Chicago...	1.75	2.00	1.98	3.63	
Tank plates, New York...	2.08	2.08	2.18	3.63	
Beams, etc., Pittsburgh...	1.70	1.75	1.85	3.10	
Beams, etc., Chicago...	1.80	1.85	2.08	3.48	
Beams, etc., New York...	2.08	2.13	2.23	3.48	
Steel hoops, Pittsburgh...	2.25	2.25	2.25	5.50	

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Sept. 6, 1921	Aug. 30, 1921	Aug. 9, 1921	Sept. 7, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh...	2.75	2.75	3.00	7.50
Sheets, galv., No. 28, P'gh...	3.75	3.75	4.00	9.00
Sheets, blue an't'd, 9 & 10...	2.25	2.25	2.40	6.00
Wire nails, Pittsburgh...	2.75	2.75	2.75	4.25
Plain wire, P'gh...	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh...	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh...	\$5.25	\$5.25	\$5.25	\$9.00

Old Material, Per Gross Ton:	Sept. 6, 1921	Aug. 30, 1921	Aug. 9, 1921	Sept. 7, 1920
Carwheels, Chicago...	\$13.75	\$13.75	\$12.50	\$38.00
Carwheels, Philadelphia...	17.00	17.00	16.00	42.00
Heavy steel scrap, P'gh...	13.00	13.00	12.50	29.50
Heavy steel scrap, Phila...	11.50	11.50	11.50	26.50
Heavy steel scrap, Ch'go...	11.00	11.00	10.25	26.00
No. 1 cast, Pittsburgh...	16.50	16.50	16.00	42.00
No. 1 cast, Philadelphia...	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.25	13.00	11.50	35.00
No. 1 RR. wrot. Phila...	14.50	14.00	14.00	33.00
No. 1 RR. wrot. Ch'go (net)	11.50	11.00	9.75	24.50

Coke, Connellsville,	Per Net Ton at Oven:	Sept. 6, 1921	Aug. 30, 1921	Aug. 9, 1921	Sept. 7, 1920
Furnace coke, prompt...	\$3.00	\$3.00	\$2.75	\$17.00	
Foundry coke, prompt...	4.00	4.00	3.75	18.00	

Metals,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	12.00	12.00	12.00	18.75	
Electrolytic copper, N. Y.	11.75	11.62 1/2	11.75	18.75	
Zinc, St. Louis...	4.20	4.12 1/2	4.20	7.90	
Zinc, New York...	4.70	4.62 1/2	4.70	7.90	
Lead, St. Louis...	4.20	4.20	4.20	8.62 1/2	
Lead, New York...	4.70	4.40	4.40	8.50	
Tin, New York...	27.25	26.75	27.75	45.00	
Antimony (Asiatic), N. Y.	4.50	4.50	4.60	7.00	

Composite Price, Sept. 6, 1921, Finished Steel, 2.279c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	These products constitute 88 per cent of the United States output of finished steel.	Aug. 30, 1921,	2.293c.
		Aug. 9, 1921,	2.364c.
		Sept. 7, 1920,	3.974c.
		10-year pre-war average,	1.684c.

a new 20-story structure by this company is expected to be placed Sept. 12. Meanwhile fabricating shops are figuring on an early award of 3600 tons for the construction of the Scott aviation field and airship hangar at Bellefield, Ill. Contracts for the construction of the 8-story addition to the store of Joseph Horne Co., Pittsburgh, which will take 3500 tons of steel, probably will be placed shortly. It has been some time since shops in this district have had so many good-sized prospects.

The general belief still is that the fall will show some improvement in business, but the more common prognostication is that it will be next spring before business really is good. Possibly, price cutting is a little less severe now than it was recently but at the same time few buyers yet are ready to admit that prices have struck bottom. Liquidation of labor has been pretty thorough and the claim of steel manufacturers that they are losing money on every ton of material sold to-day is not disputed, but the notion that railroad freight rates, more especially on raw materials, will be cut between now and the end of the year encourages hopes of lower selling prices. As yet there has been nothing in the way of a conference between shippers and railroad officials for the consideration of freight rates and it is hardly likely that the railroads will make a voluntary cut. Reports are current that a reduction on ore rates is to be made at the conclusion of the lake shipping season.

Pig Iron.—Business for the past week, though of rather moderate proportions, has served to substantiate the prices recently established. We note one sale of 500 tons of No. 3 foundry iron to a Pittsburgh melter

at \$20.50, Valley furnace, and a like tonnage of gray forge iron to the same melter at \$20, Valley furnace basis. The ordinary differentials from the base grade are 50c. and \$1 per ton, respectively, and this would mean \$21 for No. 2 foundry on the recent sales made of No. 3 foundry and gray forge. Small sales of No. 2 foundry have been made at \$21, furnace, both in the Valley and western Pennsylvania points. A few inquiries lately have developed for malleable iron with some makers quoting it at \$21 and others at \$20. A base of \$20, Valley furnace, has been done on a lot of about 180 tons basic iron but this tonnage is too small to be regarded as having established the Valley basic market. A Pittsburgh district melter recently put out an inquiry for 2500 to 3000 tons of basic and probably will close for about 2000 tons this week at about \$19, f. o. b. a western Pennsylvania furnace. No. 3 furnace, Shenango Furnace Co., Sharpsville, Pa., went into blast yesterday and will make Bessemer iron, the bulk of which will be taken by the Valley Mold & Iron Corporation. Cherry Valley furnace, Leetonia, Ohio, will be blown in to-morrow.

Average sales prices of Valley basic and Bessemer iron in August as compiled by W. P. Snyder & Co. show that business in Bessemer was at \$20 and in basic at \$18.33, as compared with \$20.87 1/2 and \$18.802, respectively, in July.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$19.00 to \$20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys.—The market still is a limited affair with prices holding at about recent levels, but with the tendency in the buyers' favor. We note a sale of 100 tons of 80 per cent domestic ferromanganese to a West Virginia melter at \$70 delivered, but also that a quotation of this price to a Valley steel maker seeking 100 tons was rejected as too high, and that a quotation of \$65 delivered on British materials did not bring an order. Nothing recently has been done on spiegeleisen, which is quotable at about \$30 to \$31 delivered for sizable lots of 20 per cent material and \$32 for small lots. Not enough interest is shown in 50 per cent ferrosilicon to determine where prices are.

We quote 78 to 82 per cent domestic ferromanganese at \$70 delivered; 76 to 80 per cent, \$68; 78 to 82 per cent British ferromanganese, \$58 to \$65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at \$30 to \$32, delivered. Pittsburgh 6r Valleys; 50 per cent ferrosilicon, domestic, \$60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$36.50; 11 per cent, \$39.80; 12 per cent, \$43.10; 13 per cent, \$47.10; 14 per cent, \$52.10; silvery iron, 6 per cent, \$25; 7 per cent, \$26; 8 per cent, \$27.50; 9 per cent, \$29.50; 10 per cent, \$31.50; 11 per cent, \$34; 12 per cent, \$36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Not much business is being done and prices to a large degree are nominal. In view of the fact that 4-in. billets have sold as low as \$29, there is considerable difficulty in getting buyers to pay more, although most makers are quoting \$30. Reports are current that the price of sheet bars has been shaded \$1 to \$2 per ton, the reports associating an Eastern sheet maker with a purchase said to have been made at \$28. Interest in slabs remains limited.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$29 to \$30; 2 x 2-in. billets, \$30; Bessemer and open-hearth sheet bars, \$30; slabs, \$30 to \$31; forging billets, ordinary carbons, \$34 to \$35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demands still are few and small and the advantage in prices is with buyers. Recently it was noted that an order was lost against which \$40 was quoted and it is now admitted that a quotation of \$38 likewise failed to bring an order. Prices are not well established. While some makers are holding firmly to \$42 for the base size of soft rods, others are willing to accept \$38 and evidently some have gone even lower since the latter quotation failed to bring business. Prices are given on page 628.

Structural Material.—Formal award of the contract for the steel for the new Sixteenth Street bridge, Pittsburgh, has been made to the Fort Pitt Bridge Co., Pittsburgh, which bid \$541,822, fabricated, delivered and erected for the 5000 tons which this bridge will require. This is the only important award recently placed here, but as the bids for the general contract for the construction of the 8-story addition for Joseph Horne & Co., Pittsburgh, are in, an award both of the general contract and of the steel is looked for shortly. The Bethlehem Steel Co. is quoting gray mill sections at 1.75c., Pittsburgh, and in view of the saving in the use of such sections standard beams to compete would have to sell, it is held, at 1.70c., Pittsburgh, or less. Plain material prices are given on page 628.

Iron and Steel Pipe.—Effective Sept. 1, the Reading Iron Co. and the A. M. Byers Co. reduced prices of standard wrought iron pipe, both butt and lap welded, \$10 per ton. Lower wage and material costs have permitted this reduction. No change has been made in standard steel pipe prices, but observance of the July 7 card on line pipe is not rigid nor are full quotations always insisted upon for oil well pipe. Jobbers are steady buyers of standard pipe, but their purchases are largely to replace sales and there is no anticipatory buying, because of the expectations of price reductions. Discounts are given on page 628.

Nuts, Bolts and Rivets.—Several makers here are seeking higher prices than are quoted in other manufacturing centers and since there has been no material improvement in the demand and there is nowhere nearly enough business to go around, this step is tantamount to a withdrawal from the market by Pittsburgh makers. This action has been forced by reason of the fact that to meet competition on nuts and bolts, steel bars would have to be bought at 1.50c. or less,

and makers serving this territory on bars are not inclined to go below 1.65c. Possibly the number of orders received has increased in the past few weeks, but the gain is too slight to occasion cheerfulness, especially as minimum prices have prevailed on such bookings. It is doubtful if operations of plants here average 15 per cent of capacity, as at least two of the larger units are down and others are running spasmodically. Prices and discounts are given on page 628.

Iron and Steel Bars.—Not much activity is noted in this district in soft steel bars, and 1.75c., base, seems to have quite generally disappeared, except as an asking price, and 1.70c. is the more common maximum. Business is reported to have been done down to 1.60c., base, and an Eastern maker, while not quoting bars in this district, is prepared to take small angles at 1.65c., Pittsburgh. No particular interest is shown in reinforcing bars and prices are nominal. The recent reduction in the puddling rate has had no effect yet on local prices of iron bars.

We quote steel bars rolled from billets at 1.60c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c., base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—The demand for spikes and other track fastenings reflects the fact that none of the railroads tributary to Pittsburgh is laying much track at present. Other sections of the country are doing better in this respect, but this does not help Pittsburgh makers of spikes and bolts because there is considerable shading of prices by makers East and West and only by absorbing some of the freight can local makers compete. Sales of standard spikes have been made elsewhere on the basis of the equivalent of \$2.40, Pittsburgh. Jobbers serving the coal mines are fair buyers of small spikes. Prices are given on page 628.

Steel Rails.—Railroads tributary to Pittsburgh still are inclined to withhold specifications against their orders placed earlier in the year, and expected improvement in this direction so far has not materialized. The fact that standard rails are one product in which prices have had no decline over the past two years possibly is behind the attitude of the railroads and reports recently current that prices were to be reduced are believed to have emanated from railroad circles. Standard rails did not advance in keeping with the general market during 1920 and current prices are considered to be relatively reasonable. Moreover, a reduction at this time would involve considerably close to 2,000,000 tons which are on the books of makers, and only a few of which have been delivered. Light rails rolled from billets still are quoted at 1.75c., but this is more of an asking than a selling price, and attractive tonnages undoubtedly would develop a lower figure, especially as rerolled rails are readily available at 1.60c., mill.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, \$45 mill for Bessemer and \$47 for open-hearth sections.

Plates.—Although occasional sales of small tonnages are made at 1.75c., the real market is from 1.65c. to 1.70c. Inquiry for the most part is merely for the purpose of determining prices to establish bids against prospective structural and tank business.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.65c. to 1.75c. f.o.b. Pittsburgh.

Sheets.—The situation has improved to the extent that price cutting is not nearly so severe as it was a short time ago. There are suggestions that some mills have been willing to go to 2.70c., base, in black sheets and to 2.20c., base, on blue annealed, but these prices are only \$1 per ton below the regular market quotations and there is some doubt that even this concession has been made, in view of the fact that the mills holding firmly to the regular quotation are getting some business. This is particularly true of the American Sheet & Tin Plate Co., which has experienced the best business in several months in the past two weeks, and is now operating at 50 per cent, the highest mark obtained in several months. This company recently turned down an order for 1500 tons of black sheets, calling for delivery over the remainder of the year. At a price of 2.75c., the company is not anxious for forward business at less than 3c. Prices are given on page 628.

Wire Products.—Buyers still are covering only their immediate requirements and while this means a steady demand, the volume is lacking and manufacturers cannot schedule mill operations very far ahead. Jobbers evidently are disposing of almost a normal amount of nails, as their orders in this product are better than they are in other wire products. Business undoubtedly would be much heavier if manufacturers were willing to guarantee prices, as it is the fear of lower prices that is making buyers confine their purchases so closely to actual needs. There seems to be no cutting of \$2.75 base, per keg, on nails, but it is commonly gossiped that concessions of \$1 to \$2 per ton are being made in wire. Following up its recent announcement giving a Nov. 1 dating on current sales of woven wire fence, the American Steel & Wire Co. has notified the trade that it will guarantee fence prices against a decline until further notice.

We quote wire nails at \$2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.50 base per 100 lb., Pittsburgh.

Tin Plate.—Demands for early delivery are still strong with those companies which have their mills running, and no trouble is being experienced in obtaining \$5.25 per base box, Pittsburgh, for standard cokes for domestic accounts. On a sale of 10,000 boxes for export to Japan, however, the price was slightly below the domestic base, because of competition from Welsh makers. Stock tin plate is selling for \$4.50 to \$4.75.

Boiler Tubes.—As is the case in practically all lines of finished steel demand for boiler tubes, both steel and iron, is purely hand-to-mouth and few makers have much business ahead. Recent reduction in wrought iron pipe has not yet extended to iron boiler tubes, but reports are heard that a downward revision, not only in prices of iron tubes, but also in those of steel is not far off. Observance of current discounts is said to be rather lax. Discounts are given on page 628.

Hoops and Bands.—The market is fairly steady at 2.25c., base, Pittsburgh, but this does not mean that the demand is good. There is a fairly good market in cotton ties and in hot rolled strips and this condition tends to restrain pressure to sell hoops and bands. It is probable, however, that if any sizable orders were presented in either product, competition would develop and that buyers would not have to go to 2.25c.

Hot-rolled and Cold-rolled Strips.—Conditions are much as they were a week ago. Consumers, who are not fastidious as to specifications and who can quite as well use plates or sheets, have succeeded lately in getting strip steel as low as 2c., base, Pittsburgh. It might be added also that to obtain supplies at this price a fairly large order has to be provided. In small lots the market is not quotable at less than 2.20c. and orders are going on the books to makers from this price up to 2.40c. from buyers who are exacting in the matter of analysis and cannot use anything which might be offered as strip steel. The general asking price on cold-rolled strips is 4c. and some business has been entered at that figure, but sizable orders are being accepted at 3.85c. and this is the more common price.

Steel Skelp.—The market is not especially firm at 1.75c., Pittsburgh, which recently has been the quotation of most makers. This price is being asked, but probably could be shaded on attractive orders. We note one export sale of 3000 tons for shipment to Scotland, at around 1.75c., Pittsburgh.

Cold Finished Steel Bars and Shafting.—The market has settled to 2.40c. base, Pittsburgh, this being the quotation of all makers. Business is fairly good as far as the number of orders is concerned but leaves much to be desired with regard to volume. Buyers are not anticipating their requirements and competition for such orders as are coming out is not keen enough to force much shading of the 2.40c. price. The Cumberland Steel Co. has announced a reduction of \$5 per ton in ground shafting, the new prices being \$2.75 per 100 lb., mill, for carloads and \$3, mill, for less than carloads.

Coke and Coal.—The recent advance in coke prices is well held and on standard furnace fuel the market is not quotable at less than \$3 per net ton at ovens. Labor troubles at one plant, which have resulted in

the complete suspension of operations, have forced the customers of that company to seek other sources of supply and these purchases have been sufficient to absorb much of the surplus supply. Brokers have been paying \$3 for spot and short contract tonnages and prices to consumers have ranged from 15c. to 25c. per ton higher. The spot market therefore is quotable from \$3 to \$3.25 and the market takes the same range on contracts. For 30 to 60-day contracts operators are quoting \$3, while for shipment over the remainder of the year the going price is \$3.25. The latter price about equals what could be done on coal. We note one contract involving 10,000 tons a month for September, October and November at \$3. Foundry coke is firm at \$4 to \$4.50, according to quality, with the demand steady rather than active. Moderate purchases for stock by the railroads and industrial consumers have given the coal market a firm tone. Mine run steam coal, Pittsburgh vein, is quotable at \$1.75 per net ton at mines, and occasionally commands more. Steam coal is available as low as \$1.50 but it runs high in ash and low in heat value. Connellsville by-product coal is quotable at \$1.80 to \$1.90, mines, and gas coal at \$2.25 to \$2.50 from non-union fields. Union gas coal cannot be sold under \$3 on today's labor costs.

Old Materials.—Business has slackened considerably in the past week in keeping with the slowing up in steel works operations, due to a falling away in orders. This development, however, has found no reflection in scrap prices, which with one or two minor exceptions are just where they were a week ago. We note the sale of 10 cars of machine shop turnings at \$8.35 per gross ton, delivered, Brackenridge, and of two cars of the same material to the same buyer at \$8.25. These tonnages, however, had to be sold and the buyer made the prices. On a round tonnage it is doubtful if less than \$9 could be done, for the principal users are ready to pay \$8.50 for such lots. Dealers will not go short of the market at that price because they fear smaller offerings for a time and it is noted too, that the Dodge Brothers turnings, sold Aug. 26, brought the equivalent of \$9, Pittsburgh. Borings offered by Dodge Brothers sold at the equivalent of \$10.50, Pittsburgh. Odd lots of heavy melting steel are bringing only \$13 to \$13.50, but contracts cannot be placed at less than \$15, if indeed that low. One large steel company is reported to have paid \$15 per gross ton for the steel offered in the last list of the Pennsylvania Railroad, central region.

We quote for delivery to consumers' mills, in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$13.00 to \$13.50
No. 1 cast cupola size.....	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.....	16.00 to 16.50
Compressed sheet steel.....	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.....	9.00 to 9.50
Railroad knuckles and couplers.....	14.00 to 14.50
Railroad coil and leaf springs.....	14.00 to 14.50
Railroad grate bars.....	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, 1/4-in. and thicker.....	17.00 to 17.50
Railroad malleable.....	13.00 to 13.50
Iron car axles.....	19.00 to 20.00
Locomotive axles, steel.....	18.50 to 19.00
Steel car axles.....	14.50 to 15.00
Cast iron wheels.....	14.00 to 14.50
Roller steel wheels.....	14.00 to 14.50
Machine shop turnings.....	8.25 to 8.50
Sheet bar crop ends at origin.....	12.50 to 13.00
Heavy steel axle turnings.....	10.00 to 10.50
Short shoveling turnings.....	9.50 to 10.00
Heavy breakable cast.....	15.00 to 15.25
Stove plate.....	12.00 to 12.50
Cast iron borings.....	9.00 to 9.25
No. 1 railroad wrought.....	12.00 to 13.00

Claims on Bethlehem Steel Co. Disapproved

WASHINGTON, Sept. 6.—Approval has been given by Secretary of War Weeks, it was announced to-day, of the recent decision of Assistant Secretary Wainwright that the War Department has no authority to pay claims of 38,000 former machinists and electricians employed by Bethlehem Steel Co. in connection with the award by the National War Labor Board, amounting to \$1,500,000. Secretary Weeks will present a written report to Congress declaring his belief Congress should take cognizance of these claims.

Chicago

CHICAGO, Sept. 6.

The steel market remains quiet, but the business outlook has improved. For August shipments from a prominent local mill were twice those of the previous month. As July was exceedingly dull, the improvement was not great; it was an indication of a slow but cumulative betterment in demand. There are multiplying evidences of the exhaustion of consumers' stocks, which is brought home to the mills by repeated requests for prompt delivery, and here and there are indications of expanding industrial activity. Tool steel, which is regarded as a fairly reliable barometer of the operations of metal-working shops, was practically a drug on the market only a few weeks ago. To-day orders for tool steel are being received in increasing number from widely distributed sources. It is also to be noted that railroad traffic has been steadily growing and while earnings are not yet what they should be, a continuation of the present rate of increase in business would soon put the carriers in a satisfactory position.

Notwithstanding these signs of industrial revival, demand for steel, particularly for plates, structural material and bars, is still far below normal. While this may indicate that buyers still believe that the process of price deflation has not yet been completed, there are some consumers who are inclined to view it as not far away and their judgment is confirmed by recent developments in the local market. An open letting by the Burlington Railroad last week brought out quotations of 1.68c., Chicago, on 1500 tons of plates, and 1.75c., Chicago, on 334 tons of shapes. In fact, current going prices are so low that one local producer is seriously considering shutting down its plate mill until prices take a turn which will permit operation without loss.

Pig Iron.—An inquiry has been received from the American Rolling Mill Co. for 12,000 tons of basic iron. Local sellers are given to understand that the company is undecided as to whether it will buy this tonnage outside or start up its own furnaces and that much depends on the character of the quotations received from other stacks. In view of a freight of \$3.50 from Chicago to point of delivery, it is not deemed likely that the business will be placed here. The local market has shown a fairly active condition during the past week or ten days. Just prior to the advance announced in our last issue, a local melter closed for 3000 tons of foundry iron. Individual sales since the advance have covered as much as 500 and 1000 tons. In some cases buyers have bought for delivery over two, three and four months ahead. Furnaces are not disposed to quote on first quarter business. The inquiry for that delivery reported a week ago has been expanded to include 600 tons of malleable iron. Other inquiries current include one from a Southern melter for 600 tons of malleable for delivery over the remainder of the year and another calls for 100 tons of low phosphorus iron. Noteworthy among recent sales may be mentioned 1000 tons of foundry, bought by a South Bend, Ind., melter, and 400 tons of foundry, purchased by a Kewanee, Ill., concern. Local producers are holding firm at present prices and another advance of \$1 a ton is looked for in the near future.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil.	
1.50, delivered at Chicago.....	\$33.50
Northern coke, No. 1, sil. 2.25 to 2.75.....	21.50
Northern coke, foundry, No. 2, sil.	
1.75 to 2.25.....	21.00
Northern high phos.....	21.00
Southern foundry, sil. 1.75 to 2.25.....	25.67
Malleable, not over 2.25 sil.....	21.00
Basic.....	21.00
Low phos., Valley furnace, sil. 1 to 2	
per cent. copper free.....	\$34.50 to 35.50
Silvery, sil. 8 per cent.....	32.82

Ferroalloys.—The market has been devoid of interest.

We quote 78 to 82 per cent ferromanganese, \$75 delivered; 50 per cent ferrosilicon, \$62.50 to \$65 delivered; spiegeleisen, 18 to 22 per cent, \$36 to \$37 delivered.

Railroad Equipment.—The Northern Pacific has awarded repairs on 500 freight cars to the Pacific Car

& Foundry Co. Of this number 125 are all-steel coal cars and the remainder miscellaneous types. The Baltimore & Ohio is inquiring for 1000 all-steel 50-ton hopper cars and 1000 steel underframe box car bodies. Inquiries for tires, axles and wheels are increasingly numerous, but individually small.

Structural Material.—The demand for structural shapes is light and quotations of 1.85c., Chicago, are not uncommon, while attractive business can be placed at a lower figure. Fabricating work is light, the only new inquiry of size being a plant building for the Standard Underground Cable Co. at St. Louis, involving 1000 tons. Recent lettings include:

Frost National Bank Building, San Antonio, Tex., 382 tons to Mosher Mfg. Co.

Masonic Temple, Sioux City, Iowa, 350 tons to Rock Island Bridge & Iron Co.

Atlas Life Insurance Co. Building, Tulsa, Okla., 500 tons to St. Louis Structural Steel Co.

The mill quotation on plain material ranges from 1.80c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—The Missouri Pacific has placed 3000 kegs of track spikes with a local mill at a price reported not to exceed 2.40c., Pittsburgh. While confirmation of this quotation is lacking, it has become apparent that ruling prices on standard railroad spikes and track bolts are not higher than 2.50c. and 3.50c., Pittsburgh, respectively. There is little demand for tie plates.

Standard Bessemer rails, \$45; open-hearth rails, \$47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.50c., Pittsburgh; track bolts with square nuts, 3.50c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Plates.—At an open letting by the Chicago, Burlington & Quincy Railroad on Sept. 2, the low bid on 1558 tons of plates and 8 tons of bars was 1.68c., Chicago, and the low figure on 334 tons of structural shapes was 1.75c., Chicago. In both cases the prices were named by local mills. As the total tonnage involved was attractive, it is improbable that small orders could be placed at the figures named. It is unlikely, however, that buyers will find it difficult to place even small tonnages at 1.85c., Chicago. The plate market is exceptionally weak and rather than continue to incur losses at present prices, one maker is seriously considering shutting down its plate mill indefinitely. In this connection it is pointed out that it costs \$2 to \$3 a ton more to roll plates than structural material and yet, owing to the present market situation, plates are selling for no more and sometimes for less than shapes. The extent to which the Pittsburgh basing practice has been affected by the decline in demand is indicated by prices submitted to the Southern Pacific on Aug. 23, for San Francisco delivery. On the plates inquired for one producer quoted 1.85c., f.o.b. Chicago mill; another 2.015c., Chicago; three Pennsylvania makers, 1.75c., f.o.b. mill; another mill 1.75c., Cleveland; while four others quoted 1.75c., Pittsburgh. On the structural material the quotations were 1.85c., Chicago mill; 1.915c., Chicago; 1.65c., Pennsylvania mill, and 1.70c., Pittsburgh. There were similar variations in the quotations on soft steel bars, but on the sheets most mills adhered to the ruling market quotations and quoted f.o.b. Pittsburgh. Railroad purchases of plates in this territory are principally for immediate needs. For example, the Rock Island is inquiring for three carloads and the Chicago Great Western for one carload, while the Illinois Central wants three carloads of plates and bars.

The ruling mill quotations range from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Demand continues light and prices remain soft. So far as can be determined the discounts published in this paragraph two weeks ago are as close to the ruling market as any which might be selected. It is to be noted, however, that there are wide variations in quotations and nothing approaching price stability is in sight.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to $\frac{3}{4}$ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, \$3 off; blank nuts, \$3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Sheets.—This commodity is far more active than plates, structural shapes or bars. Demand is widely

distributed—jobbers, railroads, roofing manufacturers and sheet metal shops being among the purchasers. Although shading has been reported here and there, the prices announced last week are holding rather generally. The upturn in demand has enabled the local independent to put on two additional hot mills, 16 out of 18 mills now being in operation.

Mill quotations are 2.75c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Bars.—There has been no material improvement in the demand for mild steel bars and the ruling market lies between 1.85c. and 2c., Chicago. Buying of bar iron is still unsatisfactory, as is evidenced by the intermittent operations of mills. Hard steel bar mills also continue to operate on a hand-to-mouth basis.

Mill prices are: Mild steel bars, 1.85c. to 2c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, square and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Cast Iron Pipe.—Detroit has awarded 1500 tons to the Lynchburg Foundry Co., after taking figures twice. The United States Cast Iron Pipe & Foundry Co. is low bidder on 255 tons for the city of Chicago. The American Cast Iron Pipe Co. is low on 600 tons for Cedarburg, Wis. Prospective business includes:

North Platte, Neb., 940 tons of 6-in., bids in Sept. 6.

Table Rock, Neb., 205 tons, Sept. 9.

Fremont, Neb., 250 tons, Sept. 12.

Springfield, Ohio, 80 tons of 6-in.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., \$45.60 to \$48.60; 6-in. and above, \$42.60 to \$45.60; class A and gas pipe, \$3 extra.

Old Material.—Outside of a purchase of a few thousand tons of heavy melting steel by a local user at \$11.50 per gross ton, delivered, and an additional purchase of No. 1 railroad wrought by an iron mill at a reported price of \$12 per net ton, delivered, there has been no buying of consequence by users. One consumer is offering \$14 per gross ton for railroad malleable, but dealers will not consider that price and are buying from the railroads at from \$14.50 to \$15 per gross ton. There are few changes in quotations to be noted, but such as have developed have been mainly upward. To a large extent market activity is still confined to the dealers. Railroad offerings include: the Grand Trunk (Battle Creek yards), 4500 tons; the Pennsylvania Northwestern Region, 1500 tons; the Pere Marquette, 2500 tons, and the Geat Northern, 2000 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$16.00 to \$16.50
Relaying rails	27.50 to 30.00
Car wheels	13.75 to 14.25
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.25 to 10.75
Low phosph heavy melting steel	13.25 to 13.75
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.00 to 7.50
Axle turnings	8.00 to 8.50

Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.00 to 10.50
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.50 to 12.00
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.25 to 13.75
No. 1 railroad cast	12.25 to 12.75
Low phosph punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.50 to 13.00
Grate bars	10.00 to 10.50
Brake shoes	11.00 to 11.50
Railroad malleable	13.00 to 13.50
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

Wire Products.—Prices are firm and trade is satisfactory. Although neither the jobbers nor the railroads will abandon their cautious policy of buying only

for immediate needs, orders from them are numerous and in the aggregate represent a substantial tonnage. Railroad buying is usually limited to carload lots. Thus the Rock Island bought one car of fencing and the Illinois Central and the Omaha, one car of barbed wire each. Perhaps the most encouraging development is the fact that manufacturers are commencing to take an interest in the market. One manufacturing consumer has placed an order for 500 tons of wire. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 628.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.38 per 100 lb.; No. 9 and heavier bright basic wire, \$3.53 per 100 lb.; common wire nails, \$3.48 per 100 lb.; cement coated nails, \$2.90 per keg.

Warehouse Prices.—Jobbers have reduced their prices on cold rolled steel bars and shafting to 4.20c. for rounds and 4.50c. for flats, squares and hexagons.

New York

NEW YORK, Sept. 6.

Pig Iron.—Quite a number of inquiries developed over the holidays, mostly for small amounts and for delivery in the next two or three months. No distinct change appears in the rate of foundry operations, the buying being due to the fact that melters are running out of iron. Prices are not uniformly firm, some business having been done at a little under the figures prevailing ten days ago. The New Jersey heating furnace company that inquired for 1500 tons for first quarter is believed to have closed for its January and a part of February requirements. Blast furnace companies, as a rule, do not care to sell for 1922 delivery at present prices. Several inquiries for 500-ton lots and one for 1000 tons are pending. The recent pig iron inquiry from abroad, supposed to be for several thousand tons, appears to be little more than an attempt to sound out this market, the real objective being the sale of iron produced in India. There are reports not readily traced of the sale of Belgian pig iron in this market in lots amounting to about 1000 tons. Buffalo sellers have been quoting \$20 at furnace for No. 2 foundry iron. Nothing has been done in Virginia iron, which is still quoted at \$22 at furnace for No. 2.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	\$22.52 to \$23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.02
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.)	28.16 to 29.16

Ferroalloys.—A representative of a German producer of ferromanganese has been authorized to quote 76 to 80 per cent ferromanganese at 4930m., seaboard, which at the prevailing exchange value is equivalent to about \$59 to \$60, seaboard. This compares with the British price of \$65, seaboard, and with the American quotation of \$70, delivered. The market is quiet and the only sale that is reported is one of 50 tons of domestic alloy. The spiegeleisen market is quiet at prevailing quotations with the sale of two carloads reported. There is no demand for high-grade foreign manganese ore and the 50 per cent ferrosilicon market is inactive but firm at prevailing quotations. We quote as follows:

Ferroalloys	
Ferromanganese, domestic, delivered, per ton	\$70.00
Ferromanganese, British, seaboard, per ton	\$65.00
Spiegeleisen, 20 per cent, furnace, per ton	\$25.00 to \$27.00
Ferrosilicon, 50 per cent, delivered, per ton	\$60.00 to \$65.00
Ferrotungsten, per lb. of contained metal, .48c to .58c.	
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	\$4.50

Ores	
Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	\$3.00 up
Chrome ore, 40 to 45 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard	\$20.00 to \$25.00
Chrome ore, 45 to 50 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard	\$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York	.55c. to .60c.

Cast-Iron Pipe.—The sudden demand for the small sizes, together with the slight stiffening of pig iron

prices, has increased the price about \$5 a ton. Last week several inquiries and orders for small tonnages came in rather unexpectedly until some manufacturers have enough work to last until Dec. 1. Makers in this district are now operating at from 40 to 70 per cent capacity. Some of the orders are attributed to the desire of municipalities to give work to the unemployed. Two sets of bids will be opened Sept 9: 100 tons of 6-in. and 10-in. pipe for Essex Fells, N. J., and 50 tons for Troy, N. Y. We now quote per net ton, f.o.b. New York, carload lots as follows: 6-in. and larger, \$47.30; 4-in. and 5-in., \$52.30; 3-in., \$62.30, with \$4 additional for Class A and gas pipe.

Finished Iron and Steel.—No notable developments in respect to business conditions are to be reported, but one mill has stiffened in its prices by refusing to make further quotations at levels below current quotations. Some of the bar business taken at 1.60c., Pittsburgh basis, has covered material rolled from billets which failed to pass billet purchase specifications and which would otherwise have been sold as scrap. In structural lines an addition to Haddon Hall, Atlantic City, is to be noted, involving 1000 tons, and the following work has been awarded or is about to be settled: Grain elevator for the Western Maryland, at Baltimore, 300 tons, to James Stewart & Co.; Chelsea National Bank, Atlantic City, 350 tons, to the American Bridge Co.; apartment at Madison Avenue and Eighty-fourth Street, New York, 700 tons, to the Paterson Bridge Co.; an addition to the Home Club, West Forty-fifth Street, 400 tons, to George A. Just Co. The Turner Construction Co. is to build a reinforced concrete warehouse in the Brownsville district of Brooklyn. The New York Central is in the market for a round tonnage of material for its shops, including axles, tires, frogs and switches, sheets, bars, plates and shapes.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.03c.; plates, 2.08c. to 2.13c.; structural shapes, 2.13c. to 2.23c.; bar iron, 2.08c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

High Speed Steel.—Quotations of domestic producers are unchanged and continue nominally at about 90c. per lb. for 18 per cent tungsten high speed steel. Steel of foreign origin is also quoted by the importers at 90c. to \$1 per lb., no effort for the present being made to shade the American market.

Old Material.—Brokers are finding it increasingly difficult to buy at present prices and the price tendency is upward, though very gradual. Purchasing by-mills is slight and confined chiefly to steel, pipe, stove plate and wrought.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$7.00 to \$7.50
Heavy melting steel, rails or equivalent	8.50 to 9.00
Rerolling rails	10.50 to 11.50
Relaying rails, nominal.....	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought.....	11.00 to 11.50
Wrought iron track	8.25 to 8.75
Forge fire	5.00 to 5.50
No. 1 yard wrought, long.....	9.00 to 9.50
Light iron	3.00 to 3.50
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	3.00 to 3.50
Mixed borings and turnings.....	3.00 to 3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long).....	8.00 to 8.50
Stove plate	9.50 to 10.00
Locomotive grate bars.....	8.50 to 9.25
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	\$16.00 to \$17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	15.00 to 16.00
No. 1 heavy cast, not cupola size.....	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Warehouse Business.—The situation is unchanged as far as volume of business is concerned, but prices continue to show a slight weakness. Swedish iron bars, which can be brought into New York in large lots at about 6c. per lb., are now quoted at 10c. per lb. out of warehouse and a fair sized order would probably bring out an even lower quotation. Blue annealed

sheets have been quite generally brought down to a basis of 3.28c. per lb. for No. 10 gage and galvanized sheets are now being quoted by practically all warehouses at 5c. per lb. for No. 28 gage. Prices of brass and copper are down ½c. per lb., corresponding with a recent reduction of wages in the brass and copper mills. Rumors of official reductions by independent mills on prices of bars and plates as high as 10c. per 100 lb. are noted by warehouses and may effect another reduction of warehouse quotations. We quote prices on page 642.

Birmingham

BIRMINGHAM, Sept. 6.

Pig Iron.—Several sales of 1.25 to 1.75 per cent silicon iron in yards of one Birmingham maker sold for \$18.50. A 300-ton lot of 3.75 to 4.25 per cent silicon sold for \$21. The base of \$19, silicon 1.75 to 2.25 per cent, was not shaded during the week so far as is known, and all the differentials were exacted at 50c. each. This applied below as well as above base. Clifton iron of the Alabama Co. has sold \$2.50 above usual grades. The state of one maker at the end of the week was this: 2000 tons on yards, of which all had been sold but a few hundred tons; orders given for shipment of 1000 tons. This practically put this concern out of the running at the beginning of this week, as it has no stock going. Turning down customers, some of them old and tried, on account of not having the grades of iron wanted, has become both disagreeable as well as usual. The situation needs but a little more demand to increase production. One experienced maker said: "We have received several inquiries for first quarter. I begin to detect more interest in first quarter than in fourth quarter. Melters seem to be convinced that iron is going high gradually, but are apparently willing to take chances with the movement prior to Jan. 1. We are not quoting for 1922." Another maker has sold a small quantity of fourth quarter iron to regular customers taking other iron. The week's transactions embraced small consignments for the Middle West, but the total was not great.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25.....	\$19.00
Basic	18.00
Charcoal	35.00

Finishing Mills.—The Gulf States Steel Co. issued from August with 40 per cent increase of active production capacity over that of July and a finishing mill production of 45 per cent compared with average of 20 per cent for first six months of year. Better demand comes from improved feeling in Southern farm circles. The Tennessee company continues operation of 6 of the 9 open hearth furnaces, rail mill, tie-plate mill, car works and Bessemer rolling mill. Some departments of American Steel & Wire Co. are on 6 days a week. Finishing steel plants generally are much busier than a month ago.

Coal and Coke.—Standard foundry coke has come down to the \$6 base again following competition.

Cast Iron Pipe.—It was a rather quiet market in high pressure pipe. Base remains firm at \$35 for 6 in., but prices are shaded for larger sizes where contracts are especially desirable. Outlook is better than current business. The Stockham Pipe & Fittings Co. has gone on 60 per cent turn following one of a 30 per cent average.

Old Material.—Cast scrap is quite active owing to increased use at pipe shops. Steel scrap is moving somewhat more actively, but prices have not changed. Some advances are momentarily expected.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	\$10.00 to \$11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Sept. 6.

Pig Iron.—A Connecticut melter during the past week purchased 100 tons of eastern Pennsylvania No. 1X foundry iron, September delivery, at \$19.50 furnace or \$23.56 delivered. Figuring differentials at 50c would bring this furnace's price back to an \$18.50 base. In this instance, however, the furnace's base is \$19.50, and, in order to secure the business, differentials were ignored. Any weakness in the market for eastern Pennsylvania irons, therefore, appears in higher silicon only. One Buffalo interest heretofore quoting No. 2 plain at \$20, No. 2X at \$20.50 and No. 1X at \$21 has signified its willingness to waive the differential on the No. 1X grade when round tonnages are involved. A sale of 125 tons of Buffalo No. 2X iron was made to a Massachusetts foundry at \$20.50 furnace or \$25.95 delivered. Otherwise sales of eastern Pennsylvania and Buffalo iron reported this week have been confined to scattered car lots of No. 2X and No. 1X at \$20 and \$21 on the Pennsylvania irons and \$20 to \$21 for Buffalo No. 2X. A local foundry purchased two 150 ton lots of Northern charcoal at an indicated full market price. Northern charcoal has been offered here, however, at \$28 furnace. Delivered pig iron prices follow:

East. Penn. sil. 2.25 to 2.75.....	\$24.06 to \$25.06
East. Penn. sil. 1.75 to 2.25.....	24.06 to 24.56
Buffalo sil. 2.25 to 2.75.....	25.46 to 26.46
Buffalo sil. 1.75 to 2.25.....	25.46 to 25.96
Virginia sil. 2.25 to 2.75.....	31.08 to 32.08
Virginia sil. 1.75 to 2.25.....	30.58 to 32.58
Alabama sil. 2.25 to 2.75.....	30.16
Alabama sil. 1.75 to 2.25.....	29.66

Finished Materials.—McClintic-Marshall Co. is awarded 600 tons structural steel for a Pawtucket, R. I., theater; the Lehigh Structural Co., 162 tons for the Ford, Green Island, Hudson River power plant; and the Shoemaker-Satterthwait Bridge Co., 123 tons for a Far Rockaway, L. I., power house. Structural awards otherwise were confined to less than 100 ton lots the past week. The 480 tons for the Cornell University building went to interests outside New England. The city of Boston is in the market for 100 tons $\frac{3}{4}$ -in. and $\frac{1}{2}$ -in. deformed bars. Local mill representatives report a falling off in bookings since last reports, due to the holidays, and a tendency to shade prices on practically everything. Local warehouses have reduced prices on blue annealed sheets 10c per 100 lb. to \$3.73 for No. 10; 50c on black to \$4.25 for No. 28; and 25c on galvanized to \$5.25 for No. 28. Otherwise warehouse prices remain unchanged, with consumption just about holding its own.

Jobbers now quote: Soft steel bars, \$2.81½ per 100 lb. base; flats, \$3.83 to \$3.93; concrete bars, \$2.50 to \$3.09; tire steel, \$4.20 to \$4.70; spring steel, open hearth, \$5.25; crucible, \$11.50; steel bands, \$3.46½ to \$3.98; steel hoops, \$4.18; toe calk steel, \$5.25; cold rolled steel, \$4.15 to \$4.65; structural steel, \$2.81½ to \$2.96½; plates, \$2.91½ to \$3.10; No. 10 blue annealed sheets, \$3.73; No. 28 black sheets, \$4.75; No. 28 galvanized sheets, \$5.25; refined iron, \$2.83 to \$4.75; best refined, \$4.75; Wayne iron, \$7; Norway iron round, $\frac{1}{4}$ -in. to 2½-in., 7.10c per lb. net; other sizes, 7.75c. base.

Coke.—New England producers of foundry coke are quoting as they did last month—\$10.66 delivered where the local freight rate does not exceed \$3.40. Several foundries resumed operations this week after periods of inactivity, but on reduced working schedules. The number is not sufficient to warrant an increased movement of foundry coke from ovens. Not enough Connellsville foundry coke is offered here to be a market factor.

Ferromanganese.—Small lots of lump ferromanganese sold this week at as low as 3¼c per lb. and ground at as low as 4½c. f.o.b. Pennsylvania shipping point. These quotations represent the bottom of the market, some small lots having changed hands at as high as 9c.

Old Material.—Without a noticeable increase in actual transactions, the market on machinery cast is firmer due to slightly freer inquiries from foundries. The largest inquiry comes from a Massachusetts textile machinery interest, for 200 tons of strictly No. 1 textile cast, for which the market is around \$19.50 to \$20, as against \$17 to \$18 on regular machinery cast. Car-lot sales of stove plate are reported this week at \$15.50 delivered Norwood, Mass. The available supply of this material is more or less limited.

Pennsylvania mills are sounding out the market on heavy melting steel, but their idea of prices and those of holders of material are still considerably apart. The market for railroad and yard wrought is softer, due to continued offerings and a lack of demand. Interest in turnings has dried up. One dealer is offered seven cars of bushy turnings at \$1.50 f.o.b. shipping point, but has no market for same. Quotations on other old materials are inclined toward softness.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$17.00 to \$20.00
No. 2 machinery cast.....	15.00 to 16.00
Stove plate	15.00 to 15.50
Railroad malleable	11.50 to 12.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$6.00 to \$6.50
No. 1 railroad wrought.....	9.00 to 9.50
No. 1 yard wrought	7.50 to 8.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.50
Machine shop turnings.....	2.00 to 2.50
Cast iron borings, rolling mill.....	3.50 to 4.00
Cast iron borings, chemical.....	4.00 to 4.50
Blast furnace borings and turnings.....	2.00 to 2.50
Forged scrap and bundled skeleton.....	4.00 to 4.50
Street car axles and shafting.....	12.00 to 12.50
Car wheels	11.50 to 12.50
Rerolling rails	9.00 to 10.00

Cleveland

CLEVELAND, Sept. 6.

Iron Ore.—Shipments of Lake Superior ore during August amounted to 4,329,158 gross tons, making the total movement for the season up to Sept. 1 14,748,072 tons, as compared with 35,349,874 tons during the same period last year. August shipments in 1920 were 9,270,763 tons. The August movement showed a slight gain over July, when shipments were 4,047,687 tons, but no increase is expected in September and a number of the ore firms are planning to clean up their shipments by Nov. 1. Present indications are that the season's shipments will barely reach the recent estimates of 25,000,000 tons. In only one year since 1904 have the season's shipments gone below 30,000,000 tons. That was in 1908, when the lake and rail shipments amounted to 26,014,987 tons.

A few merchant furnace interests that are considering the blowing in of their furnaces have put out inquiries for ore in lots of 5000 to 15,000 tons and some of these inquiries are expected to result in the placing of orders a little later.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.45; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

Pig Iron.—Sales fell off last week as compared with the previous week, but the volume of business was somewhat better than the average for the past few weeks. With the recent stiffening in prices by some makers there is a spread of \$1 a ton in prices on foundry iron. One Valley furnace which recently advanced its price to \$21 for No. 2 foundry iron reports small lot sales aggregating 2000 tons at that price. Other interests operating Cleveland and other Lake furnaces and western Pennsylvania furnaces are still quoting \$20, but in some cases are making sales at \$20.50 to \$21, the higher prices usually being for nearby delivery or where competition is largely eliminated. One selling agency reports sales aggregating 6200 tons this month. These include 500 tons of gray forge iron at \$20. This seller was offered an additional lot of 1200 tons of forge iron at the same price but declined to take the order. One producer reports sales in the week aggregating 3500 tons of foundry iron, including 700 tons to an Indiana melter and 600 tons to a Michigan furnace builder. Another producer booked 1000 tons in small lots. A 200-ton lot of 2.75 per cent silicon foundry iron brought \$21.50, the high silicon differential being figured at \$1.50. We note the sale of 200 tons of basic iron at \$20. However, \$19 is still regarded as the market on this grade for a round tonnage, although most producers are asking \$20. A few car lot sales of Southern iron are reported at \$19. Sales during August by local interests showed a fair gain over previous months this year. One producer sold over twice as much iron in August

as in any previous month this year and its shipments were 60 per cent greater than in any previous month of the year. With recent improvements in sales September shipments are expected to show a gain over August. Two furnaces are being added to the active list, one River furnace in Cleveland and Cherry Valley at Leetonia, Ohio.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a \$1.96 freight rate from Valley points, a \$3.36 rate from Jackson and \$6.67 from Birmingham:

Basic	\$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25.....	\$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75.....	26.17
Ohio silvery, sil. 8 per cent.....	30.86
Standard low phos., Valley furnace.....	36.00 to 36.25

Finished Iron and Steel.—The volume of business for the week was rather light and lots of any size are still bringing out low prices. Quotations as low as 1.65c., Pittsburgh, are reported on steel bars, plates and structural material for desirable orders, although some of the mills are not going below 1.70c. While steel bars have sold as low as 1.60c., there are indications that 1.65c. is perhaps now the minimum. Inquiry for 25,000 tons of plates for tank work has come out, including a Mexican inquiry for 18,000 tons, noted in our issue of last week. A Cleveland mill has taken 1000 tons of tank plates for Eastern shipment at about 1.65c., Pittsburgh. A Cleveland consumer has placed 800 tons of steel bars, plates and shapes at lower than 1.70c. The New York Central Railroad has placed repair work on 10,000 cars with car builders and repair companies but it is expected that the greater part of the material required will be supplied from the railroad company's present stock of material. The Lima Locomotive Corporation has taken 5 locomotives for the Clover Leaf Railroad, for which it has placed 160 tons of plates and structural material. In the building field inquiry for small lots of structural material has improved. The Masonic hotel project in Detroit, requiring 7000 tons of steel, which was recently held up, has been revived and bidders have been asked to revise their bids. The stadium for the Detroit baseball park, requiring 700 tons of steel, has been held up indefinitely. The National Iron & Wire Co. has taken the Rawlings school building, Cleveland, requiring 200 tons of steel.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Old Material.—There is moderate activity in small lots of steel making scrap and the market continues firm with no price changes. Dealers are offering \$12.35 for heavy melting steel and \$8.25 to \$8.50 for borings for Canton delivery. Sales of heavy melting steel at \$13.50 are reported to a western Pennsylvania mill. Another mill that recently bought considerable scrap will make additional purchases shortly. The local demand is very light. Local dealers are offering \$12 for heavy melting steel for delivery to a Cleveland mill, but little is to be had at that price.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel.....	\$12.25 to \$12.75
Steel rails, under 3 ft.....	12.75 to 13.25
Steel rails, rerolling.....	14.25 to 14.75
Iron rails.....	11.00 to 12.00
Iron car axles.....	18.00 to 19.00
Low phosphorus melting scrap.....	12.50 to 13.00
Cast borings.....	7.25 to 7.75
Machine shop turnings.....	6.00 to 6.50
Mixed borings and short turnings.....	7.00 to 7.50
Compressed steel.....	8.00 to 8.25
Railroad wrought.....	12.00 to 12.50
Railroad malleable.....	12.00 to 12.75
Light bundled sheet stampings.....	4.50 to 5.00
Steel axle turnings.....	9.25 to 9.75
No. 1 cast.....	16.00 to 16.50
No. 1 busheling.....	7.50 to 8.00
Drop forge flashings, over 10 in.....	5.50 to 6.00
Drop forge flashings, under 10 in.....	6.00 to 6.50
Railroad grate bars.....	12.75 to 13.00
Stove plate.....	13.00 to 13.25
Pipes and flues.....	6.50 to 7.50

Sheets.—Inquiries and sales are light. Most mills are quoting 2.75c. for black, 3.75c. for galvanized and 2.25c. for blue annealed sheets, but there are unconfirmed reports of shading \$1 to \$2 a ton on black and galvanized sheets.

Bolts, Nuts and Rivets.—Some of the bolt and nut manufacturers report that August sales were larger than in any previous month this year. Orders continue to show some gain but the demand is for small lots. The rivet market continues dull with prices unchanged. Minimum quotations reported are 2.25c. for structural and 2.35c. for boiler rivets.

Coke.—The demand for carload lots of foundry coke has improved. Standard Connellsville makes are quoted at \$4 to \$4.50 per net ton.

Buffalo

BUFFALO, Sept. 6.

Pig Iron.—Scattered sales of pig iron are the rule in this market. The total business of producers and agencies for the week was less than 10,000 tons and the largest individual sale in this total was one for 750 tons. One furnace has turned its attention to producing malleable iron to fill old contracts, and some small demand just developed. Brokerage competition has apparently been eliminated. All the iron produced by one furnace in August was shipped out. There is some talk of an interest blowing in a furnace but no decision has been reached. Requests for tonnages for delivery beyond 60 days find no interest here and the same policy not to sell on any other than immediate or delivery within two months is still in force. One producer is out of the market by virtue of the needs of its own and subsidiaries, and while they have sold scattered lots at \$20 base, they are not anxious for business at present prices.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.....	\$21.75
No. 2X foundry, 2.25 to 2.75 sil.....	20.75
No. 2 plain, 1.75 to 2.25 sil.....	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—Desirable inquiries for billets and wire rods—1400 tons of the former and 800 tons of the latter, the first to appear in this territory in several months represent the sole new development. Bar business is apathetic and while the price of 1.75c. Pittsburgh is maintained on small orders, it is by no means dominant where desirable specifications are presented. Tubular and wire products show better movement than any other material. Generally the optimistic undercurrent has not abated but there is little to base it on. Bar sales are small but sheet piling which has kept one mill busy for some time continues at a fair average. Some export business out of Canada to points in possessions of Great Britain and for finished materials has given rise to a better feeling in the Dominion. Structural business has not brought out any new projects. It is the general belief that any sizable business in this field will be deferred to next year.

Warehouse Business.—While no general falling off in sales is manifest the improvement noticed each succeeding week in August has spent itself, to all appearances. Increase in mill operation has not affected warehouse business as near as can be determined. Inquiry for structural shapes indicates that a fair business is in prospect.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.30c.; galvanized steel sheets, No. 28 gage, 5.05c.; black sheets, No. 28 gage, 4.05c.; cold rolled strip steel, 6.40c.

Coke.—Several inquiries for more than the average tonnage have appeared and indicate a livelier market. There is some difficulty in finding tonnages to fill this unusual demand, as producers are reluctant to increase operation, not knowing the stability of this business and figuring on a possibility of later curtailment. Prices are firm.

Old Material.—About 13,000 tons of heavy melting steel has been sold here by a group of dealers. Most of the tonnage was taken by a steel interest, which has been quite inactive for eight months and lately

has found sufficient business to increase operation in a few departments. A price of \$13 was maintained on this business. Larger inquiry has appeared. Several dealers are selling material for the same price as they pay for the stock.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.....	\$13.00 to \$13.50
Low phos., 0.004 and under.....	14.50 to 15.50
No. 1 railroad wrought.....	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast.....	14.00 to 15.00
Hydraulic compressed	9.50 to 10.00
Railroad malleable	12.00 to 12.50

Cincinnati

CINCINNATI, Sept. 6.

Pig Iron.—While the market was not especially active last week, there are quite a number of inquiries being figured on. One of these calls for 3000 tons of iron for shipment over the remainder of the year, the inquirer having a number of plants scattered throughout the country. A Michigan melter is in the market for 2000 tons of malleable iron and a Chattanooga interest is inquiring for 600 tons of malleable. A central Ohio melter is in the market for 400 tons of foundry iron and a Knoxville melter for a similar tonnage. There is also an inquiry for 700 tons of Southern iron for first quarter. Some sales were reported during the week, including one of 1000 tons of foundry iron to a northern Indiana melter and 350 tons of high silicon iron to a Cleveland district melter. A local melter bought 200 tons of Southern iron and a nearby melter 200 tons of Northern iron. Chicago furnaces have advised the trade that prices will be advanced to \$22 on Thursday of this week and announcement of an advance in southern Ohio iron will also likely be forthcoming. Sales made in the week were generally on the basis of \$20 to \$20.50 for Northern and \$19 for Southern iron. It is reported that a Southern furnace has advised melters with contracts for high-priced iron for first half delivery that it will sell this iron at the market and charge the difference to the buyer, if settlement is not made at once. The Marting Iron & Steel Co. will light a stack at Ironton on Sept. 15.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.....	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—An Indiana rolling mill in the week bought 1000 tons of sheet bars. The order is reported to have gone to a Chicago district mill at a price at \$30, f.o.b., mill. This would be the equivalent of about \$28, Pittsburgh. The inquiry for 1000 tons of plates and 500 tons of structural material, reported some weeks ago, is still pending, it not having been decided whether the project for which this material was required, will go ahead. Something definite is expected within the next week or so. Business in finished materials during the past week has been confined almost exclusively to carload lots, although one order for 120 tons of wire fence was placed by a railroad with the leading interest. The usual quotation on plain wire is now \$2.25 per 100 lb. Nails, however, are holding firmly at \$2.75, there being no evidence of price shading. There is a fair demand for sheets and the recent prices of 2.25c., 2.75c. and 3.75c. for blue annealed, black and galvanized, respectively, are holding firmly. On plates and shapes, 1.75c. is now commonly quoted and on larger tonnages these prices probably could be bettered. No new projects have come up in the structural field. The King Bridge Co. has been awarded the contract for track elevation work at Indianapolis for the Big Four Railroad, taking close

to 900 tons. The Pan-American Bridge Co., New-castle, Ind., has been awarded the contract for a power house at Frankfort, Ind., 165 tons being involved. Plant operations will show little change. The East Side works of the American Rolling Mills will be running practically at capacity in the week. The schedule calls for six open-hearth furnaces and 18 sheet mills. The plants of the Andrews Steel Co. and the Newport Rolling Mills at Newport, Ky., and the Whitaker-Glessner Co. at Portsmouth, will be idle.

Warehouse Business.—Local jobbers report a slow but steady improvement in orders. Tonnages inquired for are becoming larger and the number of buyers is increasing. Local jobbers of sheets have reduced their prices, following the recent changes made by the mills. No. 28 black sheets are now quoted at 4.25c. and No. 28 galvanized, at 5.25c. No other price changes have been made recently. Jobbers quote:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, \$3.25 per keg base; No. 9 annealed wire, \$3.00 per 100 lb.

Tool Steel.—Some manufacturers of tool steel have reduced prices approximately 10c. per pound and 18 per cent tungsten steel is now quoted at 90c. per lb.

Coke.—Inquiries in the coke market run all the way from 200 to 5000 tons. Buyers are apparently willing to cover for first quarter at to-day's prices, but operators are not willing to commit themselves more than a month or two ahead. The market is firmer than has been the case recently, though prices have not been advanced noticeably. Several sales of 500-ton lots were made last week, but in the main transactions are confined to one and two-car lots for immediate shipment.

Old Material.—While there is very little activity in this market, the price situation is showing a stronger tendency and advances of from 50c. to \$1 a ton have been made in the week. Some inquiries are being received for borings and turnings. Mills in other districts are also feeling the market on heavy melting steel. Dealers are of the opinion that mills would be ready to buy if they were convinced that the market had touched the bottom and are confident that the next 30 days will see a substantial improvement in the scrap market. The supply of borings and turnings is particularly light, as most of the manufacturing plants turning out this material are running at greatly reduced operations. Most dealers have advanced quotations on practically the entire list and the following quotations represent the market today:

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	\$4.00 to \$5.00
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up.....	25.00 to 26.00
Revolving steel rails	10.50 to 11.50
Heavy melting steel.....	9.00 to 9.50
Steel rails for melting.....	9.00 to 10.00
Car wheels	11.50 to 12.50

Per Net Ton	
No. 1 railroad wrought.....	8.50 to 9.50
Cast borings	2.50 to 3.00
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	12.50 to 13.50
Burnt scrap	7.00 to 8.00
Iron axles	15.00 to 16.00
Locomotive tires (smooth inside)....	9.50 to 10.00
Pipes and flues	4.00 to 5.00

St. Louis

ST. LOUIS, Sept. 6.

Pig Iron.—Selling slowed up somewhat, following the recent advance of \$1 a ton, but the market is firm and producers are maintaining \$21, f.o.b. Chicago. Inquiries involve about 4000 or 5000 tons of various grades of foundry iron, the bulk of which is for last quarter, first quarter or first-half delivery. The interest in distant delivery indicates that buyers have confidence in the present price and are anticipating needs. One inquiry covers 5000 to 10,000 tons of basic iron for shipment over the next 90 days. The permanent closing of the Sligo furnace at Sligo, Mo., whose output of 25,000 to 30,000 tons of pig iron was taken care of by the

American Car & Foundry Co., is a noteworthy development. There was an inquiry out for a carload of 14 to 16 per cent ferrosilicon. Sales of Granite City by-product coke in the week were about 1200 tons.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices \$2.80 freight from Chicago and \$.74 from Birmingham.

Northern foundry, sil. 1.75 to 2.25.....	\$23.88
Northern malleable, sil. 1.75 to 2.25.....	23.88
Basic	23.88
Southern foundry, sil. 1.75 to 2.25.....	24.74

Finished Iron and Steel.—Prices are not being well maintained on plates and shapes, and some concerns who quoted less than the market price of 1.85c., f.o.b., Pittsburgh, have not obtained the business because someone else had quoted lower. The Missouri Pacific Railroad bought 3000 kegs of track spikes and 125 to 150 tons of plates at concessions, the exact amount of which could not be learned. The market is holding firm, however, on bars. Galvanized sheets, No. 29 gauge, are in better demand, although there is only a light demand for blue annealed sheets. Some sales are being made to local jobbers to round out their stocks. The railroads are not opening up, but they are going into the market to supply their actual needs. Warehouse business is slightly better.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.50c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, \$3.77½ per 100 lb.; boiler rivets, \$3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, \$3.25; and tapped, \$3.00 off list.

Coke.—A slight improvement in demand but no orders of consequence placed describes the situation, scattering sales involving a slightly larger tonnage. The coke ovens of the St. Louis Coke & Chemical Co. at Granite City are still operating, although no pig iron is being produced. What sales are being made are on a basis of immediate delivery. Domestic coke is in increased demand. Standard Connellsville foundry coke is quoted at \$4.50 to \$5 per net ton at ovens.

Old Material.—There is no change in the prices of old materials. Consumers are not interested at present and dealers were forced to lay down in their yards all stocks recently bought from the railroads. Railroad lists before the market this week follow: Cotton Belt, 300 tons, and Pennsylvania, 2500 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron Rails	\$13.00 to \$13.50
Steel rails, re-rolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.00 to 11.50
Relaying rails, standard section....	29.00 to 30.00
Cast iron car wheels	12.00 to 12.50
No. 1 heavy railroad melting steel...	10.50 to 11.00
No. 1 heavy shoveling steel.....	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut-apart	10.50 to 11.00
Ordinary bundle sheet.....	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	5.50 to 6.00
Iron angle bars	11.00 to 11.50
Steel angle bars	9.00 to 9.50
Iron car axles	16.50 to 17.00
Steel car axles	12.50 to 13.00
Wrought iron arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought.....	10.00 to 10.50
No. 2 railroad wrought.....	9.50 to 10.00
Railroad springs	10.50 to 11.00
Steel couplers and knuckles.....	10.50 to 11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to 9.50
No. 1 dealer's forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 bushelling	9.50 to 10.00
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast.....	12.50 to 13.00
Stove plate and light cast	11.50 to 12.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.00 to 7.50
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	8.50 to 9.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	7.00 to 7.50
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.50 to 11.00
Railroad brake shoes	8.50 to 9.00

San Francisco

SAN FRANCISCO, Aug. 31.

Pig Iron.—In view of actual business, the Coast market has been very quiet of late, and few if any large transactions have been made in the past week or two. There has been, however, a small volume involving 50 and 100-ton lots. Recently the Southern Pacific Co. rejected the first bids on 800 tons of domestic material, and called for 500 tons and 300 of Nos. 1 and 2 foundry iron (2.25 to 2.75 and 2.75 to 3.25 per cent silicon). Foundry activities at present continue very greatly restricted, but reports of increased inquiry are current, leading some to anticipate better conditions in the near future. The market is more or less nominal as respects prices.

Coke.—This market reflects the dormant condition of pig iron. A few cars have been reported sold, at steady prices, but there is nothing of consequence to state at this time.

Old Material.—The most conspicuous transaction in scrap in the last week or ten days was the placing of around 2000 tons of heavy melting steel, it being understood that the price was in the neighborhood of \$10 per gross ton, delivered at the consuming works. Cast iron scrap is moving in small volume at around \$20, some prices being slightly above this figure, but buyers' ideas range lower. An inquiry from China for a quantity of scrap shearings was received and probably will be filled.

Finished Iron and Steel.—On Aug. 29, the Building Trades Council's opposition to a prolongation of the strike dissolved, and workers were permitted to seek employment under the so-called American plan for which the Builders' Exchange has been contending. At present it is estimated that about 8000 of the 11,000 men employed in May when the strike was called have returned to work, which is taken to mean that conditions are rapidly reaching their normal. It seems rather early to expect the effects of this change to become evident at this moment, but it is reported that the inquiry for concrete reinforcing bars already has increased, and fabricators are looking for a better condition in the succeeding weeks. Jobbers report a greater movement of stocks and increased replacement buying. Actual transactions of a conspicuous nature have been few in the past fortnight, perhaps the most notable being the sale of 3000 to 3500 tons of high power transmission towers by the Pacific Coast Steel Co. to the Pacific Gas & Electric for its Cordelia-Oakland and Pitt River line. There are two inquiries at present for 75 to 600 tons of relaying rails for a lumber company. A Los Angeles interest is in the market for a quantity of galvanized sheets. The Market Street Railway, San Francisco, is inquiring for 500 tons of girder rails. The Consolidated Steel Co. is figuring on 4000 tons of 60-lb. rails. Plates and sheets are being taken by the Southern Pacific Co. It has been reported that standard section T rails of foreign fabrication were offered the Western Pacific Co. for \$37.50, duty paid, delivered alongside, San Francisco, at which figure domestic makers are greatly handicapped. There has been, likewise, a slight stir in the Oriental situation of late, and local interests are now figuring on a transmission tower contract for Japan, which will involve from 1600 to 1700 tons. Japan is also in the market for steel rails and black sheets. Market prices appear to be settling somewhat, but stability has not yet been attained.

Cast Iron Pipe.—A much improved situation is reported throughout the State, especially in southern California, where quite an active municipal business is being done at various points from Los Angeles to San Diego, inclusive. Indications point to an increasing business in waterworks betterments. The city of Alhambra is in the market for 150 tons of the smaller sizes of pipe, and Lancaster received bids a day or two ago for 250 tons of 4 to 8-in. pipe. Public service corporation activity is also better, gas companies extending lines. Prices are on the point of being stabilized, but present prices show a range of from \$36 to \$40, base. Nearly all shipments of pipe for Pacific Coast points are being made by vessel.

Philadelphia

PHILADELPHIA, Sept. 6.

Though the past week has been quieter in the steel and pig iron trades than preceding weeks in August, partly on account of the Labor Day holidays, there is a general expectation here that a gradual improvement will set in shortly. There has been a tendency during the past week to postpone action on pending projects until after Labor Day. Fair buying of pig iron has continued but prices have remained where they were a week ago. The improvement in buying during August sets that month out as the best of the year in the pig iron trade, with sales in this market totaling 75,000 tons or more.

Pig Iron.—August was the best month of the year so far for the Eastern pig iron trade, with sales by Philadelphia offices aggregating at least 75,000 tons, possibly more. The past week's total sales were smaller than in the two or three weeks preceding. Prices on foundry iron remain at \$19.50, furnace, as a minimum for No. 2 plain. A new factor has entered into the pig iron situation, that being the strength of the coke market. Two inquiries by Eastern blast furnaces for coke for the last quarter brought out quotations of about \$4 a ton. Offers of \$3 and \$3.25, Connellsville, for forward delivery were refused by representative bee-hive operators. If coke prices advance there will be an added cost for pig iron manufacture, which can only be offset by reduced freight rates. An appeal for a reduction in transportation rates has been made by Eastern pig iron interests but a considerable period of negotiation is probable before any action can be taken by the Trunk Line Association and the Interstate Commerce Commission. Swedish iron ore is now being offered by a local firm at 4c. per unit, Atlantic seaboard, as compared with about 15c. per unit for Lake Superior ore delivered at nearby furnaces. However, most of the Eastern furnaces still have large ore piles which they will attempt to liquidate before making new purchases. Pig iron sales during the week have been mostly in lots of a few hundred tons each. A New Jersey melter bought 800 tons, which was divided between two furnaces. A fair volume of inquiry is pending, part for immediate shipment and the remainder for the last quarter. Some inquiries for first quarter of next year have been made but sellers are not willing to quote that far ahead. The Robeson furnace, which has been making low phosphorus iron, turned over to foundry on Tuesday, making four eastern Pennsylvania makers of foundry iron, with prospects that another furnace may blow in shortly.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.34 to \$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.84 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	29.24 to 29.74
Basic deliv. eastern Pa.	19.00
Gray forge	20.00 to 21.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Small sales of domestic ferromanganese are being made at \$70 delivered in Eastern territory and \$75 for shipment west of Pittsburgh. Spiegeleisen is not in demand but is quoted at \$27 to \$28, furnace, for 18 to 22 per cent grade.

Semi-Finished Steel.—Re-rolling mills do not find it possible to buy billets at \$30, Pittsburgh, and sell bars at current market prices, hence the demand for re-rolling billets is practically nil. Neither is there demand for forging billets because of the low condition of the forging industry. Prices are unchanged.

Railroad Equipment and Supplies.—The Baltimore & Ohio Railroad, reported last week as in the market for the repair of 2000 cars, is now asking for bids for repairing 3000 freight cars of six different types. A better demand from the railroads for tires, wheels and axles is noted. The Pennsylvania Railroad has

bought 4850 kegs of spikes at a price reported to be 2.50c. per lb., Pittsburgh.

Plates.—Further weakness in plate prices is apparent, though business of importance is lacking. Sales have been made at 1.70c., Pittsburgh, with every indication that a buyer with a fair-sized tonnage could place it at 1.65c., Pittsburgh. On carload lots or less the price is usually 1.75c. Aside from a little railroad buying for repair work the market is flat.

Structural Shapes.—The nominal price for shapes in small lots is 1.80c., Pittsburgh, but any sizable tonnage commands a better price. As low as 1.65c., Pittsburgh, has been quoted. The Dupont Engineering Co. has awarded about 1000 tons for fabrication to the McClintic-Marshall Co. for a pier at Wilmington, Del. The same project requires about 500 tons of reinforcing bars. The Viscose Building, Roanoke, Va., 1800 tons, is reported to have been awarded to a Philadelphia fabricator. A number of projects which were to have been decided last week were postponed until after Labor Day; hence may be awarded this week.

Bars.—Steel bars continue to show a degree of strength. Soft steel is being sold at 1.75c., Pittsburgh, and there appears to be very little shading on this grade, though reinforcing bars are generally obtainable at 1.70c., Pittsburgh. Bar iron is quoted at 1.65c., Pittsburgh.

Sheets.—The new prices on sheets, announced last week by the leading interest, are generally quoted by all manufacturers, namely 2.25c. for No. 10 blue annealed, 2.75c. for No. 28 black and 3.75c. for No. 28 galvanized, all f.o.b. Pittsburgh.

Wire Products.—Attempts have been made by buyers to break the wire nail price of 2.75c. per lb., Pittsburgh. Offers of 2.50c. have been refused by the mills.

Warehouse Business.—A fair gain in sales from jobbers' stocks is reported, business being much more satisfactory than it was a month or so ago. Prices have not been changed during the week.

Coke.—Foundry coke is quoted at \$4 to \$4.50, Connellsville. Offers of \$3 and \$3.25 for furnace coke for forward shipment have been refused by Connellsville operators, \$4 having been quoted in one instance.

Old Material.—It is reported that the prices received by the Pennsylvania Railroad on its recent large list of scrap averaged fully \$1 a ton above the prices received by the same road a month ago. This reflects in a general way the slight but steady improvement in the scrap trade, but there is still much to be desired as the volume of business continues at low ebb. Each purchase of importance puts prices up slightly on the particular grade in demand. Heavy steel scrap, however, is not in demand because of the lack of steel business and prices remain at \$11.50 to \$12 per ton. A slight advance in wrought scrap is noted. Cast borings are also slightly firmer. We quote for delivery in this district as follows:

No. 1 heavy melting steel	\$11.50 to \$12.00
Scrap rail	11.50 to 12.00
Steel rails, re-rolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	13.00 to 13.50
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.00 to 9.50
Cast borings (for rolling mills)	9.25 to 9.75
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	\$0.35	St. Paul	\$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 26,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2 1/2c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, 1/4 in. thick and over, and zeeks, structural sizes, 1.75c. to 1.80c.

Wire Products

Wire nails, \$2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.50; galvanized wire, \$3; galvanized barbed wire, \$3.40; galvanized fence staples, \$3.40; painted barbed wire, \$2.90; polished fence staples, \$2.90; cement-coated nails, per count keg, \$2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70 1/2 per cent off list for carload lots, 67 to 69 1/2 per cent for 1000-rod lots, and 66 to 68 1/2 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets, \$2.35 to \$2.50
Large boiler rivets, 2.45 to 2.60
Small rivets, 65, 10 and 10 to 65, 10, 10 and 5 per cent off list
Machine bolts, small, rolled threads, 70, 10 and 7 1/2 per cent off list
Machine bolts, small, cut threads, 65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer, 65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, 3/4 in. x 6 in.:
Smaller and shorter rolled threads, 70 and 5 per cent off list
Cut threads, 65 and 10 per cent off list
Longer and larger sizes, 60, 10 and 5 per cent off list
Lag bolts, 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads, 60 and 10 per cent off list
Other style heads, 20 per cent extra
Machine bolts, c.p.c. and t. nuts, 3/4 in. x 4 in.:
Smaller and shorter, 60 and 5 per cent off list
Larger and longer sizes, 60 per cent off list
Hot pressed sq. or hex. blank nuts, \$4.60 to \$5.25 off list
Hot pressed nuts, tapped, 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts, 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped, 4.25 to 4.75 off list
Semi-finished hex. nuts:
1/4 in. to 9/16 in. inclusive, 80, 10 and 10 per cent off list
Small sizes S. A. E., 80, 10, 10 and 10 per cent off list
3/4 in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages, 80, 10 and 5 per cent off list
Stove bolts in bulk, 80, 10 and 7 1/2 per cent off list
Tire bolts, 65, 10 and 10 per cent off list
Track bolts, 3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

1/2 in. and under, 70 and 10 per cent off list
9/16 in. to 3/4 in., 70 and 10 per cent off list

Mill Set Screws

1/2 in. and under, 70, 10 and 5 per cent off list
9/16 in. to 3/4 in., 70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.
All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$38 to \$42; chain rods, \$38 to \$42; screw stock rods, \$43 to \$47; rivet and bolt rods and other rods of that character, \$38 to \$42; high carbon rods, \$46 to \$54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, \$2.40 to \$2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, 1/2-in., 3/8-in. and 7/16-in., \$2.75 base; 5/16-in., \$2.75 base. Boat and barge spikes, \$2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, \$3.50 to \$3.75 base per 100 lb. Tie plates, \$2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$11.30 per package; 8-lb. coating, 1 C., \$11.60; 15-lb. coating, 1 C., \$14.30; 20-lb. coating, 1 C., \$15.55; 25-lb. coating, 1 C., \$16.80; 30-lb. coating, 1 C., \$17.80; 35-lb. coating, 1 C., \$18.80; 40-lb. coating, 1 C., \$19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.60c. to 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld			Iron		
Inches	Steel	Galv.	Inches	Black	Galv.
1/4	50 1/2	24	1/4 to 3/8	31 1/2	22 1/2
1/4 to 3/8	53 1/2	27	1/2	36 1/2	18 1/2
1/2	58 1/2	44	3/4	42 1/2	27 1/2
3/4	62 1/2	50	1 to 1 1/2	44 1/2	29 1/2
1 to 3	64 1/2	52			
Lap Weld					
2	56 1/2	44	2	39 1/2	25 1/2
2 1/2 to 6	60 1/2	48	2 1/2 to 6	42 1/2	29 1/2
7 to 12	57 1/2	44	7 to 12	40 1/2	27 1/2
Butt Weld, extra strong, plain ends					
1/4	16 1/2	29	1/4 to 3/8	41 1/2	37 1/2
1/4 to 3/8	49 1/2	32	1/2	35 1/2	23 1/2
1/2	55 1/2	44	3/4	42 1/2	28 1/2
3/4	60 1/2	49	1 to 1 1/2	44 1/2	30 1/2
1 to 1 1/2	62 1/2	51			
2 to 3	63 1/2	52			
Lap Weld, extra strong, plain ends					
2	54 1/2	43	2	40 1/2	27 1/2
2 1/2 to 4	58 1/2	47	2 1/2 to 4	43 1/2	31 1/2
4 1/2 to 6	57 1/2	46	4 1/2 to 6	42 1/2	30 1/2
7 to 8	53 1/2	40	7 to 8	35 1/2	23 1/2
9 to 12	48 1/2	35	9 to 12	30 1/2	18 1/2

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2 1/2 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel	Charcoal Iron
1 3/4 in. 21 1/2	1 1/2 in. List
2 to 2 1/4 in. 36	1 3/4 to 1 7/8 in. 10
2 1/2 to 3 in. 47	2 to 2 1/4 in. 20
3 1/4 to 3 in. 52	2 1/2 to 3 in. 25
	3 1/4 to 4 1/2 in. 27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed		Cents per Lb.	
No. 8 and heavier,	2.15	Nos. 11 and 12,	2.35
Nos. 9 and 10 (base),	2.25	Nos. 13 and 14,	2.45
		Nos. 15 and 16,	2.55
Box Annealed, One Pass Cold Rolled		Cents per Lb.	
Nos. 17 to 21,	2.45	No. 28 (base),	2.75
Nos. 22 to 24,	2.50	No. 29,	2.80
Nos. 25 and 26,	2.65	No. 30,	2.95
No. 27,	2.70		
Galvanized		Cents per Lb.	
Nos. 10 and 11,	2.75	Nos. 25 and 26,	3.45
Nos. 12 to 14,	2.85	No. 27,	3.60
Nos. 15 and 16,	3.00	No. 28 (base),	3.75
Nos. 17 to 21,	3.15	No. 29,	4.00
Nos. 22 to 24,	3.30	No. 30,	4.25
Tin-Mill Black Plate		Cents per Lb.	
Nos. 15 and 16,	2.55	No. 28 (base),	2.75
Nos. 17 to 21,	2.60	No. 29,	2.80
Nos. 22 to 24,	2.65	No. 30,	2.80
Nos. 25 to 27,	2.70	Nos. 30 1/2 and 31,	2.85

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin New York	Lead		Zinc	
	Lake	Electro- lytic		New York	St. Louis	New York	St. Louis
Aug. 31	12.00	11.62½	26.87½	4.40	4.20	4.65	4.15
Sept. 1	12.00	11.75	26.75	4.40	4.20	4.70	4.20
2	12.00	11.75	26.75	4.50	4.30	4.70	4.20
3	12.00	11.75	26.75	4.50	4.30	4.70	4.20
6	12.00	11.75	27.25	4.50	4.30	4.70	4.20

NEW YORK, Sept. 6.

The tone of all the markets is better but the amount of buying is still light. Elimination of most of the cheap lots has strengthened the copper market. The tin market is quiet and firm. Demand for lead is steady and prices are higher. The zinc market is a little more active and stronger.

Copper.—There has been a perceptible strengthening of the market as the new month opens, which is analagous to the conditions which prevailed at the beginning of July and August. In every case the end of the previous month has witnessed the necessity of some sellers to dispose of weakly held lots of electrolytic copper and, as these have been eliminated, the market has turned stronger. It is doubtful whether electrolytic copper for early delivery could be bought for less than 11.75c., New York, or 12c., delivered, and even then in limited amounts. Most large producers are not willing to meet this level and are asking from ¼c. to ½c. higher. Inquiry is fairly good and it is reported that demand from Europe is improving. It is also stated that sales to foreign countries were made last month at concessions under prevailing domestic prices. The market for Lake copper is largely nominal.

Copper Averages.—The average price of Lake copper for the month of August, based on daily quotations in THE IRON AGE, was 12c., New York. The average price of electrolytic copper was 11.70c., New York.

Tin.—With the exception of one day last week when buying was fairly brisk, the market has been quiet but firm. On Thursday, Sept. 1, about 300 tons was purchased by two or three dealers. It appears that the publication on that day of the monthly deliveries of tin showed for August deliveries larger than expected, which is pointed to as the cause of the spurt in demand. Later the market slowed down and there was more metal offered than there were buyers. An explanation of the August deliveries is that one large consumer shipped tin held in warehouses to its mills. Deliveries in the month of August are returned as 3320 tons, with the quantity in stock and landing Aug. 31 at 1761 tons. Imports for the first eight months of the year have been 12,978 tons against 36,688 tons for the first eight months of 1920. Spot Straits tin is quoted to-day at 27.25c., New York, with the London market about £5 per ton higher than a week ago at £161 5s. for spot standard, £163 15s. for future standard and £162 per ton for spot Straits, with total sales reported as 700 tons.

Lead.—The market is firm with a quiet and steady demand. Early on Friday, Sept. 2, the American Smelting & Refining Co. advanced its price 10 points to 4.50c., New York and St. Louis. The outside market is quoted at 4.50c., New York, or 4.30c. to 4.35c., St. Louis. There is a fair demand for future lead and there have been sales with prices at \$2 to \$3 per ton under those prevailing for early delivery.

Zinc.—Attempts to offer the market down have evidently disappeared and quotations are firmer, but demand has not improved particularly. Prime Western for early delivery is quoted at 4.20c., St. Louis, or 4.70c., New York, and this appears to be the minimum at which it can be bought.

Antimony.—Wholesale lots for early delivery are quoted at 4.50c., New York, duty paid.

Aluminum.—The leading producer still quotes virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery at 24.50c., f.o.b. plant, and importers of the same grade are asking 19c. to 20c., New York, duty paid.

Old Metals.—The market is firmer with a tendency toward higher prices. Dealers selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.50
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Chicago

Sept. 6.—The metals have been generally quiet but the exceedingly low levels to which tin had fallen aroused some speculative interest, which caused it to rebound. Lead has also advanced slightly, although buying is light. Numerous bids have been received at slightly below the market, but lead producers refuse to accept them. Galvanizers are buying spelter more freely and that metal has recovered after slipping down a few points last week. Old metal prices are unchanged. We quote in carload lots: Lake copper, 12.25c. to 12.50c.; tin, 28.50c. to 29c.; lead, 4.40c.; spelter, 4.30c. to 4.35c. in less than carload lots; antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

Sept. 6.—The trade in all non-ferrous metals is dormant. Lead at 4.25c., carlots, is unchanged, while zinc is slightly higher at 4.20c. We quote Lake copper at 12.73 1/2c., to 12.73 5/8c., carlots; tin, 27.86c.; and antimony, 5.23 1/2c. In old metals, we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Foundry Association Bulletin

The American Foundrymen's Association has issued from the office of the secretary, C. E. Hoyt, 140 South Dearborn Street, Chicago, the first number of an eight-page bulletin which is designed to keep the members informed on association activities, to report committee progress and furnish abstracts of current foundry literature. Announcement is made of the election of Robert E. Kennedy, formerly foundry superintendent of the University of Illinois, as assistant secretary. He will act as chairman of the committee on papers and as secretary of all technical committees. Mr. Kennedy is at present in charge of the sand research work of the association. It is announced also that by an arrangement for exchange of papers with the Institution of British Foundrymen, George K. Elliott, chief metallurgical engineer of the Lunkenheimer Co., Cincinnati, has prepared a paper for the annual meeting of the British association, and F. J. Cook, of Rudge & Littley, Ltd., West Bromwich, Staffordshire, will prepare a paper for the next meeting of the American Foundrymen's Association.

The American Pig Iron Association will hold its monthly meeting in Philadelphia on Friday, Sept. 23. After the usual business session the members will be guests of the Alan Wood Iron & Steel Co. at a nearby golf club.

The Truscon Steel Co., Youngstown, Ohio, has received an order for one of its standard steel buildings, to be 80 x 200 ft., to be erected at Beirut, Syria.

PERSONAL

William Chambers, representative of the National Service Corporation, Chicago, and affectionately known as "Uncle Billy" throughout the foundry and foundry supply trade, is recovering from a serious illness at the Presbyterian Hospital, Chicago. He is one of the oldest salesmen in the foundry field.

George P. Hansen has been appointed superintendent of blast furnaces for the American Rolling Mill Co. at Columbus. He was formerly in charge of blast furnaces at the Republic Iron & Steel Co., Youngstown.

Gus F. Ziv, formerly manager of the Chicago branch of A. Milne & Co., announces entry into business for himself as president and treasurer of the Ziv Steel & Wire Co., 4423 West Kinzie Street, Chicago. The company will engage in handling tool and solid drill steel, including hollow drill steel made in Sweden. Norman J. Hyslip has been appointed general sales manager.

Walter Price, Eastern sales manager of the Pawling & Harnischfeger Co., Milwaukee, Wis., manufacturer of electric cranes, hoists and excavators, severed connections with the company Sept. 1, to engage in his own business as an agent for Ford cars in Philadelphia. He has been associated with the Pawling & Harnischfeger Co. for more than 19 years, the greater portion of this time in charge of the Philadelphia office. During the past few years he has been manager of both the Philadelphia and New York offices. He is succeeded by T. E. Gallagher, formerly erecting engineer of the company.

Hugh E. Myers has resigned as chemist with the United Engineering & Foundry Co., Pittsburgh, after 24 years' service and will make an extended tour across the continent.

The appointment of Henry C. Morris, Washington, to head the new fuel division of the Bureau of Foreign and Domestic Commerce, has been announced by the Department of Commerce. He is a graduate of the Massachusetts Institute of Technology. He has had experience as a mining engineer in Colorado, Nevada, California, and in examination work in Mexico, Canada, and Missouri. In 1917 entered the Fuel Administration as a mining engineer, serving until May, 1918, when he was transferred to Bureau of Mines where work included membership on the Capital Issues Advisory Committee and related applications and on the War Minerals Investigation. He was nominated by Secretary Lane as representative of the Bureau of Mines on the economic liaison committee at its inception and served continuously until his resignation, June 1, 1920.

Paul A. Billings has been appointed district sales manager in Michigan and Toledo, Ohio, by the Falcon Steel Co., Niles, Ohio. Mr. Billings will be located at 2306 Dime Bank Building, Detroit.

Walter Graham, who in the war period made investigations for the United States Fuel Administration and the Ordnance Department of the Army, and has also done research work for the Bureau of Standards and the Tariff Commission, is now connected with the Technical Credit Association, 2 Rector Street, New York. It is announced that investigations will be made in chemical, mining, mechanical, metallurgical and other lines.

C. B. Cole has opened a consulting engineer's office at 546 West Washington Boulevard, Chicago, specializing on tools, gages, interchangeable manufacture and inspection systems.

A. G. Sherman, Detroit Vapor Stove Co., at a meeting of the Detroit chapter of the Society of Industrial Engineers, was elected president of the chapter for the ensuing year. F. C. Shafer, Penberthy Injector Co., was elected treasurer.

Chairman John A. Topping of the Republic Iron & Steel Co. is spending September in Canada.

Ross R. Harrison has been made assistant general manager of the Manufacturers Iron & Steel Co., New

Brunswick, N. J. The company operates the Neverslip Works at New Brunswick, the Canadian Neverslip Works at Montreal and the Bryden Horseshoe Works at Catasauqua, Pa.

Chairman E. H. Gary of the United States Steel Corporation has gone to Mexico on a vacation trip.

Harry W. Bishop, Jr., who was with LaBelle Iron Works sales department for 10 years and later connected with the Pittsburgh office of the Wheeling Steel Products Co., has become associated with the sales department of the Superior Pipe Co., Pittsburgh, mills of which are at Columbia, Pa.

E. W. Pelton, manufacturing superintendent of the Stanley Works, New Britain, Conn., has recovered from an operation for appendicitis and has returned to his desk.

John B. Smiley, president Poldi Steel Corporation of America, will sail for a two months' stay in Europe on Sept. 20.

Laird Park of the pig iron firm of Park & Williams, Real Estate Trust Building, Philadelphia, has returned from an European trip.

J. R. Stroh has been appointed manager of traffic and mining operations of the Brier Hill Steel Co., Youngstown, Ohio, owing to the retirement of C. H. Haynes as traffic manager. Heretofore Mr. Stroh has been in charge of the mining department.

F. R. Eldridge, Jr., general manager of the Far Eastern Division, Department of Commerce, who accompanies the San Francisco Chamber of Commerce party on a tour to the Orient, sailing from San Francisco on Oct. 1, will make an extended visit to India after the tour of Japan, China, the Philippines and Dutch East Indies. Manufacturers and others who would have Mr. Eldridge make inquiry as to the opportunities in India for trade in their particular products are asked to communicate with him at Washington.

OBITUARY

DANIEL BAKER, president Standard Lime & Stone Co., died on Aug. 8, at his home in Baltimore. He had been in declining health for more than a year. He was born in Frederick county, Maryland, in 1858, and received his education in the public school of that county, later graduating from Western Maryland College. Mr. Baker began his business career as a clerk in a country store. Later he became associated with the business conducted by his father under the name of Daniel Baker & Sons. He continued with that business until 1888 when, with his brothers, William G. and Joseph D. Baker, he organized the Standard Lime & Stone Co. About a year later the brothers organized the Washington Building Lime Co., of which he was president. He also was a director in numerous financial and charitable institutions.

CHARLES H. FOOTE, well known in the steel trade as an officer of the Illinois Steel Co. for a number of years, died Aug. 28 at Burlington, Vt., aged 79 years. Mr. Foote was first vice-president of the Illinois Steel Co. under the John W. Gates régime in the late eightennineties, and had the same connection after the company was taken over by the Federal Steel Co. He was also first vice-president in the early years of the Steel Corporation. His brother, F. H. Foote, was blast furnace manager at South Chicago during a portion of his incumbency. Charles H. Foote was one of the organizers of the Pocahontas Coal & Coke Co., and after the organization of the United States Steel Corporation was president of its Southwest Connellsville Coal & Coke Co. and the Eureka Fuel Co. Mr. Foote leaves two daughters and a son, Thomas W. Foote of Cleveland.

FRANK B. BLAUVELT, vice-president R. K. Carter & Co., New York, iron and steel purchasing agents, died Aug. 31 at Bretton Hall Hotel, that city, at the age of 59. He was born in New York and entered the employ of the Carter company at the age of 12.

JAPANESE INQUIRY GOOD

Tin Plate, Structural Steel, Sheets and Rails Specified—German Ferromanganese at \$57, Atlantic Port

NEW YORK, Sept. 6.—Small orders for various kinds of material are reported from South American markets and Japanese purchases continue on about the same level as for some time, neither increasing nor decreasing in their total. Competition from German bidders continues a phase of the South American markets. One exporter in New York, quoting on railroad material for Ecuador, recently received two small turnouts at about \$250 each, but lost the rail portion of the order calling for 5 kilometers of 55-lb. rails, to a German mill. German manufacturers, however, are apparently filling up their books rapidly.

It is reported that German mills are referring foreign orders for gas and water pipe to the United States, claiming that they are unable to quote prices in competition with the American mills. The representative in this country of a large German interest recently received notice that no deliveries on locomotives of any type could be promised under nine months. According to the American commercial attache at Buenos Aires, Argentine, although German competition is keenly felt there in small manufactured articles, they are less effective in bidding on locomotives, machinery and rails. German ferromanganese, 76 to 80 per cent, can be put down on the Atlantic seaboard at a price probably better than 4930 m. (about \$57, with the mark equal to 1.15c.). A New York export house during the past two months has placed about \$200,000 worth of business in Europe for delivery to its foreign customers.

Inquiries from Japan, although steady, have been

rather light lately, particularly in structural material and heavy sheets. There has been some activity in tin plate of oil can size and weight and black sheets as heavy as No. 18 gage, but chiefly up to No. 31 gage, as well as light tonnages of steel bars and light and medium weight rails. A Japanese export house recently booked an order for a total of 700 base boxes of oil can tin plate and another exporter with an inquiry for 1000 base boxes of tin plate approached an independent mill, which refused to accept the order as it had just booked a 9000-box order from the Orient. An inquiry still pending from Japan calls for about 4000 tons of 60-lb. rails and there is a tender, bids on which will be opened in Japan about Sept. 9, which specifies 610 transmission towers involving about 2500 tons of structural material for the Tokio Electric Light Co., Tokio. A bridge inquiry on which bids were recently submitted totals about 650 tons of structural steel. A Japanese contracting company has issued an inquiry for about 1800 tons of 60-lb. rails and a few black sheets of light gage, the order, later to be increased to about 2500 tons. The rails are for an extension to a Japanese railroad line, for which this company received the contract, but a credit basis of part payment and the balance on notes of the company, to be paid when the contract is completed, is requested.

The recent reduction of Swedish prices by about 20 per cent has brought quotations on Swedish iron down to a point where it can be put down in New York, duty paid for about 6c. per lb., and probably a lower price on a large tonnage. High-speed steel of Swedish make is still maintained at from 90c. to \$1.15 per lb., depending upon the quality. There is evidently an effort on the part of importers of foreign steel, particularly high-speed steel and other high-grade materials, to maintain the American domestic price pending the settlement of the tariff.

ASK RATE REDUCTIONS

Eastern Pig Iron Manufacturers Petition for Relief from High Freight Rates

Eastern manufacturers of pig iron, principally those in eastern Pennsylvania, but including also a few New York and New Jersey furnaces, have made a joint appeal to the Traffic Executive Committee, Eastern Territory, Trunk Line Association, 143 Liberty Street, New York, for relief from present high railroad freight rates on iron ore, coke, limestone, etc. It is stated that transportation costs for assembling raw materials to make one ton of pig iron are to-day \$14.50 for Eastern furnaces, which is approximately 70 per cent of present selling prices, whereas in 1914, when iron sold for \$14 a ton, transportation charges for assembling materials for a ton of iron were only \$7, or 50 per cent of the selling price. It is stated that present railroad rates are higher than the industry can stand in view of the trend of market prices downward during the past several months. A hearing on the petition will probably be held about Sept. 15. It reads as follows:

As manufacturers of pig iron, operating blast furnaces in Eastern territory, we hereby request your committee to give prompt and favorable consideration to a reduction in transportation charges on the raw materials used in furnace operations, viz.: iron ore, bituminous coal, coke, limestone and dolomite.

We are moved to make this request under the conviction that a substantial reduction is absolutely necessary to permit the operation of the furnaces, and is the prerequisite to a return to activity in pig iron production, which is the basis of the iron and steel industry. Operations at the present time and for several months past have been on a very low level and many plants have suspended entirely.

Liquidation in both labor and prices has progressed to a marked degree. Labor rates have been reduced 40 to 45 per cent from the maximum and tonnage wage rates proportionately. In this respect we have gone much farther than other industries, and yet our cost of production is nowhere near matching up with the price that we obtain. Prices have declined from \$30 to \$50 per ton prevailing three or four years ago, and in more recent times to to-day's prices of \$18 to \$20 per ton; and during the period that this decline in the price of pig iron has taken place transportation charges have correspondingly increased, so that we now find ourselves burdened with an abnormally high and prohibitive freight level.

The extent to which the present high cost of transportation affects existing conditions will be apparent to your com-

mittee from the fact that in 1914 pig iron was made and sold at \$14 per ton delivered, and the furnaces were able to operate. At that time freight assembling costs were about \$7 per ton, or 50 per cent of the selling price, whereas to-day transportation charges alone on materials necessary to produce one ton of pig iron (including rail haul on ore from mines to lake port, water and rail transportation to furnaces) and delivery charge amount, in a representative case, to approximately \$14.50 per ton, or over 70 per cent of the current pig iron price, leaving less than 30 per cent of the selling price to cover the cost of the ore, coke and other raw materials, as well as labor and general manufacturing expenses.

Freight charges on the commodities we use have advanced since 1917 from 65 per cent in case of iron ore to over 100 per cent on fire brick, with total advance since 1914 of over 100 per cent. The transportation charges alone on inbound raw materials required for a ton of pig iron are to-day greater than the selling price of pig iron in Belgium, and with the prevailing low ocean rates we are confronted with competition from that source which menaces our ability to operate and may result in the extinction of heavy tonnages of raw materials that yield large revenues to the railroads.

The raw materials used in the manufacture of pig iron are low grade commodities. They are transported by the carriers in great bulk and generally in trainload lots, with minimum liability as to loss and damage, all of which tend to low operating costs. Furthermore, the considerable changes that have taken place in our industry have thrown out of all proportion what might be regarded as a normal ratio between prices and transportation charges on the commodities on which we are seeking reductions, and it is quite apparent to us that the rates now in effect are greater than the traffic can bear and certainly higher than the industry can stand. We are all aware that there must be liquidation and we firmly believe that the steel industry, in both labor and selling price, when considering the value of the dollar to-day as compared to its pre-war value, has been fully liquidated. Surely transportation charges must undergo the same process.

Under these conditions we are compelled to ask relief, and we respectfully urge your immediate consideration of the question so vital to us and of no little importance to the welfare of the railroads as well.

Detroit's Back to Normal Convention

The Detroit committee on arrangements for the "Back to Normal" credit convention of the Motor Accessory Manufacturers Association, soon to be held in Detroit, will consist of C. W. Dickerson, vice-president Timkin-Detroit Axle Co., chairman; E. R. Ailes, treasurer Detroit Steel Products Co.; M. A. Moynihan, secretary Gemmer Mfg. Co.; William Hendrie, secretary Detroit Gear & Machine Co., and Thomas M. Simpson, credit manager Continental Motors Corporation.

British Iron and Steel Market

Continental Price Margin Narrowing—British Steel Again Competitive—Demand Improving Slightly

(By Cable)

LONDON, ENGLAND, Sept. 6.

There has been no further increase in the production of Cleveland pig iron, but it is anticipated that three more furnaces will be blowing within a few days. Increased interest is being shown in foundry iron, but prices are still too high, and supplies of No. 3 G. M. B. are practically unobtainable. No. 4 foundry iron may be had in fair quantities and prices are easier.

Hematite position is improving. Six furnaces are now blowing, but makers generally are awaiting the advent of cheaper fuel before making a general resumption of activity. Home demand is increasing. East Coast mixed numbers have been reduced. Foreign ore is quiet and it is difficult to name an exact price, owing to the various freights ruling. Nominal quotations on Bilbao Rubio are 27½s. to 28½s. (\$5.09 to \$5.27) ex-ship Tees.

British semi-finished steel is now competing with that from the Continent. Welsh sheet bars have been sold at £7 7½s. (\$27.29) delivered, and British 2-in. billets are being done at £7 10s. (\$27.75) delivered Midlands. Belgium is now quoting billets at £6 15s. (\$24.97) f.o.b.; sheet bars at £6 15s. f.o.b. German works are full up to the end of the year and are not now quoting.

Continental finished steel prices are also hardening. Belgian merchant bars are being sold at £8 10s. (1.40c. per lb.) f.o.b., and £8 15s. (1.45c. per lb.) is now being asked. German plates are being done at £9 (1.49c. per lb.) c.i.f. Bombay, and £9 5s. (1.53c. per lb.) c.i.f. is now quoted. German merchant bars of rod sizes are being done at £9 12½s. (1.59c. per lb.) f.o.b. Ordinary

sizes are quoted up to £8 15s. (1.45c. per lb.) f.o.b., for December delivery.

British home trade quotations are unchanged, but export figures are generally easier. Demand is showing signs of slight improvement.

Tin plates are quiet and easier. For prompt delivery, 23s. basis (\$4.25) is quoted f.o.b. December, and January call for 22s. (\$4.07) f.o.b. The Far East is still buying fairly steadily, but other markets are dull. Stocks of wasters are becoming scarce. Sellers of 28 by 20 in. are asking 39½s. (\$7.31) f.o.b. Quarter wasters are nominally 16s. (\$2.96) f.o.b.

Galvanized sheets are weaker. There is some inquiry, but business is done only in meager parcels. Black sheet quotations have been reduced in hopes of attracting buyers, but the Continent is under-cutting in thick gages. Demand from the Far East has fallen off.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$3.70 per £1 as follows:

Durham coke, delivered...	£1 15	\$6.47
Cleveland basic	7 7½ & 7 10*	27.29 & 27.75
Cleveland No. 1 foundry...	7 0	25.90
Cleveland No. 3 foundry...	6 15	24.97
Cleveland No. 4 foundry...	6 5	23.12
Cleveland No. 4 forge...	5 17½	21.74
Hematite	7 0*	25.90
East Coast mixed	7 0	25.90
Ferromanganese	18 0 & 14 10*	66.60 & 53.65
Rails, 60 lb. and up	10 0 to 14 0	37.00 to 51.80
Billets	7 10 to 8 0	27.75 to 29.60
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.60 to 31.45
Tin plate base box	1 2 to 1 3	4.07 to 4.25
C. per Lb.		
Ship plates	13 0 to 14 0	2.15 to 2.31
Boiler plates	18 0 to 19 0	2.97 to 3.14
Tees	13 0 to 14 10	2.15 to 2.39
Channels	12 5 to 13 15	2.02 to 2.27
Beams	12 0 to 13 10	1.98 to 2.23
Round bars, ¾ to 3 in.	12 0 to 12 10	1.98 to 2.06
Galvanized sheets, 24 g.	20 0 to 20 10	3.30 to 3.39
Black sheets	16 0	2.64
Steel hoops	17 0	2.81
Cold rolled steel strip, 20 g.	26 10	4.38

*Export price.

Prices Being Gradually Reduced—Resumption in Blast Furnaces Slow

LONDON, ENGLAND, Aug. 25.—The situation does not show much improvement. Economic conditions are at last being more clearly recognized by most sections of the community and that is at least a step in the right direction. Wage earners see the advantage of a low wage in preference to none at all, and the general tendency of prices is towards that low level without which no revival in trade is possible. A hopeful feature is the downward tendency of fuel prices. This has already made marked progress, and "slack" has been offered in certain directions at 21s compared with fully 52s last year.

In iron and steel, the resumption of pig iron production has been slow, but more furnaces are gradually being put into operation. In the Cleveland district about 15 are now working, but some of these are producing pig iron for certain steel works and not for the open market. Durham coke is now obtainable at 30s at the ovens, but the ironmasters apparently do not see their way yet to any wholesale reductions in pig iron prices. There is little demand, however, and when supplies of No. 3 foundry are wanted, producers ask the buyers to take an equal quantity of No. 4 foundry. For this mixture they ask a price of 132s 6d per ton, while No. 4 foundry alone is obtainable at 125s. As these figures are above continental rates, the latter iron must continue to be imported. Hematite shows little change, but makers seem to have sold fairly well, and are firmer for export which is now quoted at 155s with the home trade at 160s. The production of pig iron last month was 10,200 tons against 750,600 tons in July of last year.

In finished iron and steel, trade improves only very gradually and makers are realizing the necessity of cutting their prices. At the end of last week steel manufacturers in Scotland and the north east of Eng-

land reduced the home trade quotations of steel generally by 20s per ton, while for export they appear to be willing to book business at lower figures. There is a general disposition on the part of buyers to hold off however until the market has stabilized itself.

A gratifying feature has been the settlement of the disastrous ship joiners' strike. An arrangement has been made under which there will be an immediate reduction of 6s per week and one of 3s in October, while in December another 3s reduction will be considered. The strike has lasted since the beginning of December last, and had its origin in the proposed withdrawal of the 12s a week bonus granted in the Spring of last year. The strike has been a most unfortunate one having retarded ship building and driven much repair work out of the country.

The Commercial Shearing & Stamping Co., Youngstown, Ohio, has completed a new plant for the production of steel stampings and shearings with a capacity of 3500 tons per month. It is located on a site of 13 1/2 acres. This plant is now producing shearings of plates and blue annealed sheets, cut to size, sketch or design. The products of the plant include steel parts pressed cold up to 1/2-in. in thickness and to dimensions of 48 1/2-in. wide and 120-in. in length, some for the automotive and agricultural implement trades.

The new fabricating plant and warehouse recently completed by the Fred A. Tarrier Co., Columbus, Ohio, is now in full operation. The plant has a capacity of 20 tons of fabricated steel daily and a large stock of steel bars and structural shapes is carried in stock. The company has plans in contemplation for the erection of a new fabricating shop, 60 ft. x 300 ft., but it is not expected that anything will be done on it until next year.

IRON AND INDUSTRIAL STOCKS

Lessening of Liquidation Caused Prices to Turn Upward Last Week

A change for the better is noted in the market for iron and industrial stocks. Higher prices for securities presumably are not due so much to any material increase in investment buying as they are to a lessening of liquidation. The sharp upturn in the raw cotton market has been a contributing factor as well to the better market for securities. Further cuts in prices quoted for automobiles the past week were far less unsettling than when initial reductions were announced. Reports of softness in the market for certain steel products likewise are less disturbing than heretofore, presumably because more people believe a turn for the better has come in the consumption. Certain it is the consumption of copper metal is on the mend and the strength of lead suggests a larger demand for that metal. The proposed reduction in freight rates on iron and steel products from eastern manufacturing points to the Pacific coast is generally construed as constructive. The decrease in the number of idle freight cars is reassuring. While available funds are by no means plentiful, the money situation continues to gradually improve.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	29 1/2 - 32 3/4	Lack. Steel	37 - 39
Allis-Chalm. pf.	.. - 71	Midvale Steel ...	23 - 24 1/4
Am. Can. com.	25 1/2 - 26 3/4	Nat.-Acme	14 - 14 1/4
Am. Can. pf.	79 3/4 - 81	Nat. E. & S. com.	31 1/4 - 33 3/4
Am. C. & F. com.	122 - 125 3/4	N. Y. Air Brake.	48 3/4 - 51
Am. Loco. com.	84 3/4 - 87 1/2	Nova Scotia Steel	24 1/4 - 25
Am. Rad. com.	67 3/4 - 68 1/2	Pittsburgh Stl. pf.	.. - 79
Am. Stl. F. com.	22 - 24	Pressed Stl. com.	51 - 53 1/4
Am. Stl. F. pf.	.. - 80	Ry. Stl. Spg. com.	75 1/2 - 80
Bald. Loco. com.	74 1/4 - 79	Replogle Steel ..	20 - 25
Beth. Stl. Cl. B.	47 3/4 - 50 3/4	Republic com. . .	45 - 47 3/4
Beth. Stl. 8% pf.	.. - 98	Republic pf.	81 - 83
Chic. Pneu. Tool	47 3/4 - 48	Sloss com.	32 3/4 - 35
Col. Fuel	22 3/4 - 24 3/4	Trans.-Williams..	.. - 31
Cruc. Steel com.	54 - 57 1/2	U. S. Pipe com.	12 1/4 - 14
Cruc. Steel pf.	79 1/2 - 80	U. S. Pipe pf.	41 - 42
Gen. Electric ..	118 1/2 - 125	U. S. Steel com.	73 1/4 - 76
Gt. N. Ore Cert.	27 3/4 - 29	U. S. Steel pf.	109 - 109 1/4
Gulf States Steel	31 3/4 - 33 3/4	Vanadium Steel .	27 - 31 1/2
Int. Har. com.	72 - 77	Va. I. C. & Coke ..	.. - 63
Int. Har. pf.	100 - 101	West'ghouse Elec.	42 - 44

Industrial Finance

The United States Auto Gearshift Co. of Eau Claire, Wis., manufacturer of hydraulic gearshifting devices for motor vehicles, has filed a voluntary petition in bankruptcy. Schedules reveal liabilities of \$278,424.45 and assets of \$749,258.42.

Creditors of the Ogren Motor Car Co., 674-702 National Avenue, Milwaukee, manufacturer of passenger automobiles, have assumed charge of the affairs. Informal statements by Clarence J. Richards, 425 East Water Street, attorney for the company, admit liabilities of \$125,000 and claim assets of \$150,000.

Owing to unsatisfactory earnings, further curtailment or abandonment of dividends on common stock by iron and steel producers in the Mahoning Valley is predicted. For the second quarter, the Youngstown Sheet & Tube Co. paid 50c. per share on its junior issue, while the Trumbull Steel Co. declared 15c. per share. The common dividend was omitted by the Brier Hill Steel Co. and Sharon Steel Hoop Co.

An involuntary petition in bankruptcy recently was filed in the United States court in Pittsburgh against the Sligo Iron & Steel Co., Connellsville, Pa., by the McCairns Foundry Co. which has a claim of \$58.33, the Connellsville Machine & Car Supply Co., with a claim of \$683.42, and the First National Bank, Greensburg, Pa., on a note for \$7,267.68.

A voluntary petition in bankruptcy recently was filed in the United States court, Pittsburgh, by the West Penn Fuel Co. Liabilities were listed at \$260,629 and assets at \$400,645, of which the principal amount, \$394,228, represents debts due on open accounts.

The report of the Canadian Locomotive Co., Kingston, Ont., for the year ended June 30 last makes, as far as earnings are concerned, a very favorable showing, but like some other Canadian industries, the outlook for the current year is not as good as it might be, according to Aemilius Jarvis, chairman of the board of directors, who proceeded as follows: "Net profits for the year were \$767,891, which the addition of interest from the company's investments of \$59,260 brought up to a total of \$827,091. Deductions from this were \$90,900 for bond interest, \$125,000 for depreciation, the same amount was so appropriated in the previous year, and \$6,800 writing down of investments to market value, making total appropriations of \$221,800, leaving \$605,291 to be added to credit balance of \$1,210,983, bringing the total up to \$1,816,275. Of this, sinking fund provi-

sions total \$15,000 and stock dividends \$265,000 or a total of \$280,000 in all, leaving a credit balance to carry forward of \$1,536,275.

A special stockholders' meeting of Peck, Stow & Wilcox Co., Southington, Conn., small tools, etc., has been called for Sept. 23, to act on a motion to authorize an increase in the capital from \$1,500,000 to \$2,000,000.

Gross earnings of the Colorado Fuel & Iron Co. for the three months ended June 30, last, were about half those for the corresponding period last year: \$7,990,093, as against \$14,239,347. Net earnings for the quarter amounted to \$682,490, contrasted with \$2,130,273 last year. After interest charges, taxes, depreciation, etc., there was a deficit of \$273,752. In the corresponding quarter last year there was a surplus of \$1,162,571.

The Union Tool Co., Orange, Mass., of which Emory E. Ellis is president and treasurer, has voted to issue 3,000 shares of 8 per cent cumulative preferred stock, par \$100.

Bankers announce that the recent issue of \$3,000,000 8 per cent first mortgage Keystone Steel & Wire Co. sinking fund bonds, recently offered for public subscription, have been sold.

Arrangements have been made for the purchase and retirement of 80,000 shares Motor Products Corporation capital stock at \$50 a share. Each shareholder has the right for a period of 14 days from Aug. 23, to sell to the corporation his pro rata of stock, not exceeding 40 per cent, deposit of same to be made with the Empire Trust Co., New York.

The operating net earnings of the Todd Shipyards Corporation for the year ended March 31 last, amounted to \$7,359,444, contrasted with \$15,224,630 for the previous year, and \$12,292,767 for the year before that. Net profits were \$3,094,327, \$6,617,139 and \$1,134,582, respectively, while dividends paid in those three years were \$1,540,502, \$794,198 and \$667,673, respectively. The company ended the past year with a surplus of \$1,553,824, whereas the surplus for the previous year was \$5,822,941, and for the year before that \$456,909.

A receiver has been appointed for the Composite Metal Lath Co., Hobart, Ind. The plant of the company was only recently constructed.

The Valley Forge Steel & Tool Co., 118 North La Salle Street, Chicago, has increased its capital stock from \$12,000 to \$20,000.

The Ireland & Matthews Mfg. Co., Detroit, manufacturer of automobile parts, mostly metal stampings, announces that it will increase its capital stock by \$700,000. The company was organized in 1889 with a capital of \$30,000. At present a total of \$2,000,000 worth of products is being manufactured annually. The new issue is to provide for greater facilities and the development of several new products.

Walden-Worcester, Inc., to Be Reorganized

The business of Walden-Worcester, Inc., Worcester, Mass., manufacturer of wrenches, will be reorganized under the ownership of a new corporation of which J. Verner Critchley, founder of the Critchley Machine Co., will be president and Warren S. Bellows, formerly general manager of the Walden-Worcester, Inc., general sales manager. The new board of directors will represent the interests of the stockholders of the old company as well as the bank and merchandise creditors. Under an arrangement with the creditors it is believed the company's indebtedness will be paid in full and a going business left in prosperous shape.

The business has been operating under the management of receivers for almost a year, and much of the time has been running on a normal basis of production, a condition which still continues. The details of the new corporation will not be settled until the claims of creditors have been turned in to the depository, and an order of sale secured from the court which appointed the receivers.

Sharp Decline in Earnings

Although production generally increased in the plants of the Lake Superior Corporation, Sault Ste. Marie Ont. during the year ending June 30, last, conditions developed, especially in the last half of the fiscal year, which resulted in a large reduction in the net earnings from operations of subsidiary companies. These earnings in the annual report just sent to the shareholders are shown to be \$1,541,293, compared with \$3,722,152 in the previous year. "Your directors very much regret," stated President Wilfred H. Cunningham, "that results for the fiscal year, together with the requirements of the Steel Corporation and other subsidiary companies, prohibit the payment of interest on the income bonds."

Machinery Markets and News of the Works

BUILDERS RESUMING

Attractive Orders Have Enabled Some Plants to Re-Open for Three Months

Automotive Industry Improving—Used Tools in Good Demand

The encouraging features of the week are the re-opening of some of the Middle Western shops and the improvement among the automotive industries. One plant in the Cincinnati district has secured an order for special machinery which will take three months to complete, thereby causing the shops to be reopened and 400 men to be put to work. Another shop was scheduled to resume with 50 per cent of its force Sept. 6 because of a new order for 60 machines for several railroad shops. According to the report of the Seventh Federal Reserve district both the passenger automobile industry (eliminating the biggest producers of low-priced cars) and the farm implement business operated in July, 1921, at about 60 per cent of the capacity of the same month the year before. New England reports that the automotive fields furnish the chief source of buying.

Small shops are buying more than the larger plants, taking the cheaper types and often trading in old

machinery in part payment for new. In some centers used tools are more active than new, particularly in New England. There a dealer sold 24 tools during the week, 19 of which were second hand.

The Chicago, Rock Island & Pacific Railroad inquiry for about 10 tools is the only new railroad asking of importance. The city of Lynn, Mass., bought 13 tools, 10 of which were lathes, from a Boston concern. At an auction sale of machines of the Burgess Co. & Curtis, aeroplane manufacturers, Marblehead, Mass., on Sept. 1 prices made were comparatively low, but much higher than those at the last previous auction sale in that district.

Formal price reductions include: Ten per cent on a popular line of riveting machines; 15 per cent on a Cincinnati line of grinding machines; 15 per cent by a St. Louis manufacturer of upright drilling and milling machines.

Inquiries have come from the following foreign districts: England, South Africa, Australia, Japan and Mexico. A Cincinnati builder was asked to quote by a New York exporting house which is rumored to represent a syndicate which was recently authorized to develop important resources abroad. It is said that the syndicate will secure bids on \$100,000,000 worth of various equipment.

New York

NEW YORK, SEPT. 5.

Though there is but little change in the machine-tool situation the tendency is toward optimism, based on more inquiry and the revival of feelers on propositions which have long laid dormant while prospective purchasers awaited lower prices. Buyers are very thorough in their shopping, spreading inquiries broadcast. As an example, one New York representative received an inquiry for a certain tool from four different sources, which at casual glance would appear to be a demand for four machines, but which he recognized as being for but one. The New York Central is in the market for two engine lathes and one drill press for its shops at Avis, Pa. The Department of Education, New York, is expected to buy considerable equipment this month, including small lathes and milling machines.

The crane market shows but slight change from the preceding weeks. Buyers have little inclination to place orders and several inquiries that have been in the market for some time are still pending. Specifications for the 34 gantry cranes of 3-ton capacity for the piers being erected at Stapleton, S. I., by the city of New York for the Pan American Terminal & Dock Co., have been issued. Bidders are required to deposit \$25 for blue prints and drawings. A tender has been issued by the New York State Barge Canal Commission, specification No. 119, calling for bids on a 3-ton burling crane for erection at the Mott Haven terminal. George P. Coulter, 1713 Sansom Street, Philadelphia, who recently inquired for a 10-ton capacity electric crane for the American Chemical & Sugar Machinery Co., has purchased a used 10-ton crane. The Shepard Electric Crane & Hoist Co., has sold a 6½-ton, 80-ft. span electric crane with 2½-cu. yd. bucket to the Standard Wholesale Phosphate Co., Curtis Bay, Md., and a 3-ton, 21-ft. span underhung traveling crane to the Chapman Valve Co., Indian Orchard, Mass.

C. A. Carey, 247 West Sixty-fourth Street, New York, manufacturer of automobile wheels, has leased the three-story building, 50 x 100 ft., at 221-23 West Sixty-fourth Street, for a new plant. The present works will be removed to this location. C. A. Carey, Sr. and Jr., head the company.

The Air Cooling Corporation, New York, has been incorporated with a capital of \$50,000 by R. Purdue, J. C. Bettinson and J. P. Broomell, 17 East Forty-second Street, to manufacture refrigerating machinery and parts.

The Perkins Machine & Foundry Co., Amsterdam, N. Y.,

has filed notice of change of name to the Collins Loom Works, to specialize in the manufacture of textile machinery.

The International Paper Co., 30 Broad Street, New York, has commenced preliminary construction for its new hydro-electric generating plant on the Saranac River, near Cadyville, N. Y., estimated to cost about \$250,000. It will be used for paper mill operation in this section.

The Sinclair Millitor Corporation, New York, has been incorporated under Delaware laws with capital of \$1,100,000 to manufacture automobiles and parts. It is represented by the United States Corporation Co., 65 Cedar Street.

The Gryphon Rubber & Tire Corporation, Bailey Avenue and 192nd Street, New York, has filed plans for the erection of a two-story addition, 102 x 103 ft., to cost about \$75,000. D. M. Whipple is president.

The Pennsylvania Car Co., New York, has been incorporated under Delaware laws with capital of \$1,000,000 to manufacture railroad cars and equipment. The incorporators are J. H. Van Moss and James H. Durbin, New York, and L. B. Coppinger, Sharon, Pa. The company is represented by the Corporation Trust Co. of Delaware, Dover, Del.

The Northold Garage Corporation, New York, recently organized, has leased the six-story building, 50 x 100 ft., at 518-20 West 147th Street, for a new automobile service and repair works.

The Morgan Harvester Co., New York, has been incorporated under Delaware laws with capital of \$11,000,000, to manufacture harvesting machinery, plows and other agricultural equipment. It is represented by the United States Corporation Co., 65 Cedar Street.

The Safety First Auto Lock Corporation, Brooklyn, has been incorporated with a capital of \$250,000 under Delaware laws by Samuel L. Seider, Warner Howard and Chester Clark, Brooklyn, to manufacture special locks and locking devices. It is represented by Woodburn Martin, Georgetown, Del.

The Malcolmson Briquet Engineering Co., 39 Cortlandt Street, New York, has been merged with the St. Louis Briquette Machine Co., St. Louis, under the name of the Malcolmson Engineering & Machine Corporation. The consolidated company will manufacture roll-type briquetting presses, fluxers and other special machinery, parts, etc.

The Ambro Stores & Garage Corporation, 512 Fifth Avenue, New York, has filed plans for a three-story auto-

mobile service and repair plant, 149 x 184 ft., at 527-37 West Eighteenth Street, to cost about \$150,000.

The Pyrene Mfg. Co., 17 West Forty-ninth Street, New York, manufacturer of fire extinguishers, has purchased the six-story, reinforced-concrete factory at Belmont Avenue and Peddie Street, Newark, N. J., heretofore owned and occupied by the Aluminum Goods Mfg. Co., to be used as its main works in the Eastern district. The New York plant on East Thirty-second Street will be removed to the new location. The Aluminum Goods Company will remove its plant from Newark to its main works at Manitowac, Wis.

The Florence Pipe Foundry & Machine Co., Florence, N. J., will commence the immediate erection of a new one-story forge shop and works building to cost about \$25,000.

The Erie Railroad Co., 50 Church Street, New York, will install considerable mechanical equipment at its new pier to be constructed at the foot of Twelfth Street, Jersey City, N. J., estimated to cost about \$1,000,000. R. C. Falconer, company address, is engineer for the work.

Fire, Aug. 28, destroyed the plant of the Rex Novelty Works, Inc., 1421 Grand Street, Hoboken, N. J., manufacturer of composition products, with loss estimated at about \$150,000, including machinery.

The Monarch Mfg. Co., Jersey City, N. J., has been incorporated with a capital of \$50,000 by Joseph P. Montagne, H. B. Watson and Frederick C. Henn, 665 Newark Avenue, to manufacture pumping machinery and parts.

The State Poultry Producers' Association, Vineland, N. J., has preliminary plans under way for the erection of a new cold storage and refrigerating plant.

Fire, Aug. 31, destroyed the building occupied by the Cooper Hewitt Electric Co., Adams Street, Hoboken, N. J., manufacturer of electrical equipment, with loss estimated at close to \$100,000. The company was recently taken over by the General Electric Co.

The Rafter Machine Co., 579 South Grove Street, Irvington, N. J., manufacturer of marine engine parts, etc., has acquired property at Joralemon and Stephen Street, Belleville, N. J., 112 x 164 ft., for a new machine shop. Preliminary plans are being prepared.

The Ampere Boiler & Tank Co., East Orange, N. J., has filed notice of organization to manufacture boilers, tanks, etc. It is headed by Elwood B. Hendricks, 645 Springdale Avenue, East Orange, and associates. The same interests have organized the New York Zinc Co., and the New Jersey Lead Co., both to operate at Newark.

The Celluloid Co., 290 Ferry Street, Newark, will soon take bids for the erection of a new one-story works building, 73 x 210 ft., at Niagara and Wescott streets, estimated to cost about \$200,000.

Philadelphia

PHILADELPHIA, SEPT. 5.

S. W. Evans & Son, 4623 Paul Street, Philadelphia, manufacturers of metal products, have awarded a contract to the William Steele & Sons Co., Sixteenth and Arch Arch Street, for an addition to their plant to cost about \$125,000.

The Philadelphia Piston & Grinding Co., Philadelphia, is being organized by Harry J. and Earl J. McClees, and Harry D. Weightman, to manufacture automobile engine cylinders, pistons, etc., and operate a general repair works. The company is represented by Thomas H. McCaffrey, 1418 Walnut Street. Application for a State charter will be made Oct. 6.

The Universal Flying Machine Corporation, Philadelphia, has been incorporated under Delaware laws with capital of \$50,000 by Emil Sitte and Charles Pampe, Philadelphia, to manufacture airplanes and parts. It is represented by the Capital Trust Co., Dover, Del.

The Franklin Sugar Refining Co., 125 South Orianna Street, Philadelphia, will make extensions and improvements in its power house at Reed and Meadow streets to cost about \$20,000.

Ovens, boiler equipment, conveying machinery and other mechanical apparatus will be installed in the new three-story brick and steel plant, 125 x 130 ft., to be erected by the Mayer Baking Co., Sixtieth Street and Hazel Avenue, Philadelphia, estimated to cost \$140,000. Contract has been let to the Wark Co., 231 South Broad Street.

Charles Wacker, 1345 West Cumberland Street, Philadelphia, manufacturer of wagons and parts, is taking bids for an addition at 1304-8 West Cumberland Street.

The J. W. Paxson Co., 1021 North Delaware Avenue, Philadelphia, Pa., manufacturer of foundry equipment, has filed plans for a new one-story building at Algon Avenue and Luzerne Street, to cost about \$35,000.

The Columbia Steel Equipment Co., Third and Annsburg streets, Philadelphia, manufacturer of steel filing cabinets,

etc., has acquired property, 100 x 102 ft., for the erection of an addition.

The Chamber of Commerce, Widener Building, Philadelphia, Sheridan Taylor, secretary, is in negotiations with H. P. French, representative in this country for Anthony H. G. Fokker, Holland, manufacturer of aeroplanes, for the establishment of a branch plant at Philadelphia.

L. M. Davis, 1616 Chancellor Street, Philadelphia, is taking bids for a two and three-story addition to his automobile service and repair building, 60 x 60 ft., to cost about \$75,000. Ralph N. Priest, 1627 Sansom Street, is engineer.

The John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire rope and other wire products, has preliminary plans under way for a new one and two-story addition, 500 x 850 ft., for the production of copper and other wire, estimated to cost about \$150,000. H. C. Tomlinson is company architect.

The Read Machinery Co., Inc., 231 North George Street, York, Pa., has completed plans for a new two-story machine shop, 40 x 100 ft., to cost about \$16,000.

The Harrisburg Corporation, Harrisburg, Pa., operating the plant of the Harrisburg Foundry & Machine Works, is planning to establish a department to manufacture an oil burner, known as the Wat-R-Oil Burner.

The Harrisburg Machine & Electric Welding Co., Harrisburg, Pa., is being organized by John Fox Weiss and Elmer R. Erb, Harrisburg, and associates, to manufacture machinery and parts, and operate a general repair works. Application for a State charter will be made Sept. 15.

The Pennsylvania Supply & Mfg. Co., Allentown, Pa., has been incorporated with a capital of \$50,000, to manufacture metal products. Harvey L. Kuhns, Allentown, is treasurer.

Electric light and power companies, operating in Pennsylvania, have made application to the Public Service Commission, Harrisburg, for permission to issue bonds and stocks for extensions and improvements as follows: Metropolitan Edison Co., Reading, bonds, \$50,000; Sayre Electric Co., Sayre, \$40,500; Bradford Electric Co., Bradford, \$379,000 in bonds; Penn Central Light & Power Co., Altoona, stock, \$547,863; Eastern Pennsylvania Railway Co., Pottsville, bonds, \$39,000; and Weisenberg Township Electric Light & Power Co., Topton, stock, \$20,000.

The Susquehanna River & Western Railroad Co., New Bloomfield, Pa., is completing plans for a new local machine shop for locomotive and car repair work.

Buffalo

BUFFALO, SEPT. 5.

The Lamson Co., Boston, Mass., manufacturer of pneumatic tubes, conveying machinery, etc., has commissioned J. T. Cowley, Lowell, Mass., architect and engineer, to prepare plans for its new works at Eastwood, near Syracuse, N. Y., estimated to cost close to \$1,000,000. The company will remove its plant at Lowell, Mass., to the new location. William F. Merrill is president.

Fire, Aug. 30, destroyed a portion of the plant of the Delaney Forge & Iron Corporation, 300 Perry Street, Buffalo, with loss estimated at about \$200,000.

The following electric light and power companies have filed notices of increase in capital, the proceeds to be used for plant extensions, improvements, etc.: The Hannawa Falls Water Power Co., Potsdam; from \$300,000 to \$1,000,000; Potsdam Electric Light & Power Co., from \$22,000 to \$75,000; Ogdensburg Power & Lighting Co., from \$50,000 to \$150,000; and the Massena Electric Light & Power Co., from \$50,000 to \$150,000.

The Phillips Lens Corporation, Rochester, N. Y., has filed notice of change of name to the Phillips-Werth Optical Co.

The Birk-Notman Motor Co., Buffalo, has been incorporated with a capital of \$75,000 by R. and F. H. Birk, and W. J. Notman, to manufacture automobile parts and equipment. The company is represented by J. P. Schaus, Curtiss Building.

The Fleman-Gilbert Motor Car Co., Syracuse, N. Y., has been incorporated with a capital of \$200,000 by B. Fleman and M. Gilbert, to manufacture automobile equipment and parts. The company is represented by L. O. Grossman, attorney, Syracuse.

New England

BOSTON, SEPT. 5.

Business was spotty in the local machine-tool market the past week. Collectively, it shows considerable improvement, but more used than new tools have changed hands. The most encouraging feature is that buying the past week evidently is not a flash in the pan, for, with few exceptions,

dealers report more new inquiries and considerably more looking about the market for the purpose of getting a line on prices. Elsewhere in New England reports by dealers are not as optimistic. The most active source of inquiries at the moment appears to be the automotive field. The more important machine tool houses here are banking on a few of the large industrial plants covering certain requirements this month.

One local dealer reports sales of two dozen tools this week, consisting of six used automatic screw machines, two new No. 4 screw machines, one used hand miller, three used bench milling machines and one used 14-in. lathe to a Greater Boston firm, and one used 24-in. Hendey shaper, one used 16-in. x 8-ft. Prentice lathe, one used 16-in. x 7 ft. Reed lathe, one used LeBlond milling machine, one used six-spindle drill, one new Garvin die slotting machine, one new Carter & Hakes miller, one new Automatic Machine Co. press, one used 20-in. upright drill, one used No. 2 Cincinnati universal grinding machine and one used 8-in. Boynton & Plummer shaper to various New England manufacturing interests. The J. H. Spaulding & Sons Co., North Rochester, N. H., has purchased two Gould & Eberhardt and one Hendey shaper, one 3½-in. radial drill and pipe machine, all rebuilt, part of which will be used in its New York State subsidiary plant.

W. H. J. Fitzgerald & Co., Boston, report sales of two new Standard 16-in. lathes to nearby garage interests, as well as miscellaneous equipment to local dealers. The Southworth Machine Co., Portland, Me., printing machinery, has taken Heald internal grinding machine equipment, while a Worcester, Mass., firm purchased a single grinding machine costing in the neighborhood of \$3,000. The Amoskeag Mfg. Co., Boston, has closed on a 12-spindle multiple drilling machine and a 60-ton Northern crane for its Manchester, N. H., plant. Lynd-Farquhar Co., Boston, has sold to the city of Lynn, for a vocational school, the following equipment: Nine 9-in. lathes, one 14-in. lathe, one sensitive drill, one hack saw, one wet tool grinder, all standard belt driven tools, one gas furnace and chucks for the lathes.

Prices for both new and used tools sold the past week are reported as soft and in certain instances liberal terms are offered prospective customers. List prices on one popular selling line of riveting machines have been cut 10 per cent, and those on a Cincinnati line of grinding machines nearly 15 per cent.

Inquiries heretofore referred to come from outside as well as in New England. For instance, a Cleveland threading tool manufacturer is inquiring for horizontal drilling machines of the Garvin type adapted to drill ¼-in. holes and larger, and a vertical milling machine of the Becker No. 2, No. 2A and No. 2B type, as well as vertical milling machines of the Garvin No. 20 type, only without rotary table and power feed. The same firm is looking for 18 x 24-in. plain milling machines of the Cincinnati Milling Machine Co. type and thread milling machines for short internal and external work. Canadian interests are inquiring for a shear, 72-in. between housings, with a 30-in. throat. One of the largest New England inquiries comes from St. Albans, Vt., and concerns used 5-ft. plain universal radial drills, pulley drive, and three-spindle drill presses.

Both manufacturing interests and dealers were well represented at the auction sale at the plant of the Burgess Co. & Curtis, Marblehead, Mass., aeroplanes, on Sept. 1. While prices paid were comparatively low, they were very much better than those realized at the last New England auction sale. Wood-working machinery sold at good prices, due to keen competition between Boston and New York interests. A Rivett bench precision lathe, with a 47-in. bed, sold at \$337.50; a manufacturers' bench precision lathe, with a 42-in. bed, made by the same company, at \$275; another with a 42-in. bed at \$190; a similar tool at \$150; while a bench precision milling machine, made by this firm, brought \$85.

A Rahn Larmon 20-in. x 11-ft. screw cutting engine lathe changed hands at \$487.50; a 16-in. x 9-ft. Greaves-Klusman screw cutting engine lathe at \$300; Bilton plain milling machine, \$375; Sipp quick change four-spindle sensitive drill, \$237.50, and a Charles G. Allen four-spindle upright drill, \$187.50. An F. E. Wells & Sons Co. tool, cutter and reamer grinder, went for \$90; a Standard Machinery No. 7-6 inclinable power press, with 1½-in. stroke, \$105; H. G. Barr four-spindle sensitive drill, \$55; Boynton & Plummer crank and gear shaping machine, \$50; Champion Blower & Forge 15-in. upright drill, \$45; Grays No. 1 sheet metal cutter, \$150, and a sister tool, \$165. The rest of the metal-working equipment offered sold on about the same basis.

The city of Boston is erecting a four-story, 43 x 142-ft. chemical and laboratory research building on Harrison avenue, to cost \$370,000.

Bids have been taken on a one-story plant, 60 x 100 ft., contemplated by the Williams & Anderson Co., 33 Broad Street, Providence, R. I., jewelry manufacturer.

Coxter's Toy Shop, Collinsville, Conn., is erecting an extension and installing new machinery in the original quarters. A furnace and forge department will be installed in the addition.

Plans are formulating for the creation of the Liberty Sales Co., an organization that will take over the manufacture of spark plugs and automobile accessories formerly produced by the Federal Corporation, Westfield, Mass., now bankrupt.

Officials of the Boston Elevated Railway Co. are again considering the erection of a machine shop in Everett, Mass. Present plans call for the construction of a foundation this fall and the erection of the superstructure in the early spring.

The Majestic Mfg. Co., 70 Commercial Street, and the Persons Mfg. Co., Worcester, have been consolidated under the name of the Persons-Majestic Mfg. Co., capitalized for \$100,000 in preferred stock and 600 shares of common, no par value, to manufacture bicycle and motorcycle accessories. Charles A. Persons, 490 Salisbury Street, is president, and Frank E. Billings, 26 Wyola Drive, treasurer.

S. I. DeSimone, 365 Border Street, Boston has filed plans for a new one-story machine shop.

The Hampden Tool Co., 344 Main Street, Springfield, Mass., has awarded a contract for a new one-story shop, 40 x 90 ft. E. J. Pinney, Inc., 374 Main Street, is contractor.

A. F. Robinson, Commercial Avenue and Binney Street, Cambridge, Mass., has awarded a contract to Joslin & Landry, 161 Devonshire Street, Boston, for a new one and two-story boiler and plate shop, 95 x 195 ft., at Binney and Second streets, to cost about \$50,000.

The Universal Valve Co., New Britain, Conn., has been incorporated with a capital of \$25,000 by E. P. Burns, M. C. and George LeWitt, 17 Main street, to manufacture valves, fittings, etc.

Fire, Aug. 27, destroyed the plant of the United Railway Signal Co., Providence, R. I., manufacturer of railroad torpedoes and other signal apparatus, with loss reported in excess of \$75,000.

The Martin Motor Co., Springfield, Mass., recently organized, is arranging for the establishment of a plant to manufacture small automobiles, consisting of a car made of aluminum and duralumin, weighing about 200 pounds. Charles J. Glidden is president, and Charles H. Martin, head of the Martin Rocking Fifth Wheel Co., is interested in the company.

The Silrose Mfg. Co., Providence, R. I., manufacturer of emblems and other metal specialties, has removed its plant from 100 Fountain Street to 44 Franklin Street for increased manufacturing facilities.

C. A. Wilson, 16 Fox Street, West Springfield, Mass., has awarded a contract to Emil Rioux, 65 Summer Avenue, Springfield, for a new one-story machine shop on Riverdale Street, West Springfield, 30 x 50 ft.

Chicago

CHICAGO, SEPT. 5.

The past week has been a quiet one, both store calls and mail inquiries being less numerous. One of the few developments of interest was the appearance of another railroad inquiry, a small list from the Chicago, Rock Island & Pacific, including a 3-in. pipe threading machine, band saw filing machine, pipe bending machine, circular saw filing machine, a D-4-A Grand Rapids drill grinder with capacity up to 4-in. drills, No. 2½ wet tool grinder with 24 x 3½-in. grinding wheel, Yankee single end wet drill grinder for grinding drills from ½ to 4-in., and a 5 WA alternating current motor-driven floor grinder with 12 x 1½-in. wheel. Aside from the Rock Island and the Santa Fe, no railroads are in the market. A large list was included in the Burlington's 1921 budget, but it is likely that action on it will be deferred until next year.

While industrial users of tools are still buying little, many are experiencing an expanding demand for their products and some are increasing their operations. The Aug. 31 report of the Seventh Federal Reserve District shows that the automotive industry is in a far better condition than was generally appreciated. The output of automobile truck manufacturers in July was 87 per cent of the production in that month a year ago. Eliminating the big-

gest producers of low-priced cars from calculations, the passenger automobile industry operated in that month at 57 per cent of the rate of production in July, 1920. The farm implement business is estimated at 57 per cent of 1920. From another source it is reported that an important manufacturer of tractors sold 1200 machines in the month of August. In view of the almost complete paralysis of that industry the first half of the year, the movement of that number of tractors is a source of encouragement. Although it is still held in well-informed circles that there can be no real revival in the farm equipment trade until a year from now, it seems plausible that this fall will at least show an improvement over the rest of 1921. Small shops are, in many cases, getting back to normal faster than the larger industries. A local manufacturer of arbor presses who was on the verge of closing down definitely a few weeks ago, is now finding it difficult to fill the orders which suddenly commenced to flow in. A further evidence of the slow, but steady revival of general business activity is the fact that building permits issued in Chicago in August exceeded the number issued in any similar period in the last seven years. Just when the change in general trade conditions will be reflected in the machine tool market cannot be forecast, but it is the opinion of some that a noticeable improvement in demand will develop before the end of this year and that by next spring trade will be normal.

Only one further change in machine tool prices has been reported the past week, a 15 per cent reduction by a St. Louis manufacturer of upright drilling and milling machines.

The Midwestern Mfg. Co., 126 South Sixteenth Street, Maywood, Ill., has been incorporated with \$10,000 capital stock by Lillian Hoffman, Ode L. Rankin and Joseph Lustfield to manufacture novelties and mechanical appliances.

The Moline Plow Co., Moline, Ill., is negotiating for the taking over of the machinery and business of the Moline Engine Co., which operated the Root & Vandervoort plant in East Moline. The machinery in the East Moline plant is being dismantled and will be removed to the tractor plant of the Moline Plow Co. in Rock Island, Ill., where it will be used for the production of tractor and automobile engines.

The Briskin Mfg. Co., 215 South Hoyne Avenue, Chicago, plans the erection of a two-story addition to its sheet metal works, 50x77 ft., to cost \$25,000.

The Hercules Steel Post Co., Niles, Mich., has had plans drawn for a one-story factory, 50 x 250 ft., to cost \$25,000.

The Crampton Mfg. Co., manufacturer of store fixtures, 1518 East Fifty-third Street, Chicago, has let contract for a one-story factory, 50 x 150 ft., 6900 Cottage Grove Avenue.

A. W. Zuanstrom, 2331 East Sixty-eighth Street, Chicago, is having plans prepared for a new one-story machine works and automobile repair shop, 46 x 50 ft., at 1532 East Sixty-seventh Street. E. N. Braucher, 6 North Clark Street, is architect.

Considerable electrical equipment and paper-working machinery will be installed in the new one and two-story plant to be erected by the Sewell Clapp Envelopes, Inc., 23 Desplaines Street, Chicago, estimated to cost \$250,000. Contract has been let and work will be placed under way at once.

The Ideal Utilities Corporation, Homewood, Ill., has been chartered under State laws to manufacture electrically operated dish-washing machinery and other equipment for domestic service. The incorporators are Owen D. Kinsey, Willis E. Howes and Lewis U. Heller, Homewood.

Fire, Aug. 26, destroyed the automobile service and repair works of Wallace Perry, Aberdeen, S. D., with loss estimated at close to \$100,000.

The Northern States Power Co., Minneapolis, Minn., is planning the construction of a new hydroelectric generating plant near St. Paul, Minn.

Ohio

The Cleveland machine-tool market shows very little change, although some dealers report an increase in inquiries for from one to three machines. As a whole sentiment has improved the past few weeks. Orders are coming almost wholly from small shops and these as a rule are reported to be buying cheaper types of machines. Many transactions are trade deals. The seller, to get an order, has to take in some old machinery and consequently cannot figure a profit until he has disposed of this used machinery.

The first signs of increased activity are expected to come from the railroads, as few industrial plants will need additional equipment even with normal operations. A local



Mr. DuGuay, a salesman of the Van Dorn Electric Tool Co., Cleveland, decided some time ago that if he were to continue to get orders for drills, he would have to take the drill to the work. Accordingly a bench drilling stand supporting a portable drill was attached to the running board of his automobile, as shown in the accompanying illustration.

builder of drilling machines states that his company is getting virtually no orders for standard tools, but that it is making some sales of machines of special types which manufacturers are buying to replace standard equipment with a view of cutting down production costs.

Conditions in the Cincinnati machinery market have not materially changed the past week. Some companies report the month of August the best for the past several months and expectations are that September will show a steady improvement. A number of shops which have been closed for the past five or six weeks will reopen this week. In at least one of these, 400 men will be put to work, quite a few orders having piled up which cannot be handled from stock. This company is also reported to have secured a large list for special machinery which it will take about three months to complete. The order for 60 tools reported in last week's issue of THE IRON AGE has been confirmed and the shop booking it will reopen this week with about 50 per cent of normal force. The schedule calls for the order to be completed in three months. It is not known where the machines are destined, as shipping instructions have not yet been received. The General Motors inquiry for tools for its Dayton plants is still pending, as is an inquiry from the Imperial Japanese Navy for a number of machines, including eight engine lathes.

The past week a local manufacturer received an order for a machine from England, the first for many months. Some inquiries are coming in, however, for export, South Africa and the Far East being the principal sources. Refrigerating machinery manufacturers report the receipt of a number of orders from South Africa, Australia and Japan. Several inquiries are still pending from these countries. Some interest is also being shown in Mexico as a possible market for machine tools.

A Cincinnati manufacturer is in receipt of a communication from a New York exporting house seeking information on machine tools. The letter states that it has been retained by a syndicate, the name of which was not disclosed, to secure bids on approximately \$100,000,000 worth of equipment to be exported. The intimation was given that this syndicate has received a concession from some foreign government, for development of important natural resources. It is expected that more information will be available shortly.

The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio, recently booked an order for 45 dump cars for South Africa. This order follows a number of others from China and Manchuria. Incoming inquiries, the company reports, tend to show that business is steadily increasing.

The Electric Furnace Co., Alliance, Ohio, has recently taken export orders for two electric furnaces for melting silver. One order was for a 35-kw. pit type crucible melting furnace.

similar to one installed several years ago, at the plant of the William A. Rogers Co., Ltd., Niagara Falls. The order for this furnace was placed by Mitsui & Co. for shipment to the Japanese Government. The other order came from Johnson, Matthey & Co., London, and was for a standard 50-kw. tilting type.

The Bowling Green Die & Tool Co., Bowling Green, Ohio, will add to its present line of products the manufacture of electric washing machines, designed by R. L. Swartz, superintendent of the company.

The O'Neill Engineering Co., Toledo, Ohio, has been incorporated by Frank O'Neill, Frank R. Smith and others and will establish a plant in the Factories Building, Toledo, for the manufacture of special machinery.

The Aetna Welding Co., 4613 Broadway, Cleveland, has placed a contract for a one-story welding shop, 40 x 66 ft.

Detroit

DETROIT, SEPT. 5

The Perry Mfg. Co., Inc., Argentine, Mich., has been organized to manufacture farm equipment. It is capitalized at \$100,000 and is headed by W. L. Coop, engineer and manufacturer, formerly of Flint. The company has taken over the tools and equipment of the Ground Hog Tractor Co., Holly, Mich.

The Commercial Pattern & Mfg. Co., Detroit, has been organized by Ernest J. and Leo J. Rousseau and Lynn C. Beadle with a capitalization of \$40,000 to manufacture metal patterns, brass and aluminum castings, etc. The headquarters are at 8772 Quincy Avenue, Detroit.

The Hercules Steel Post Co., Niles, Mich., will soon start construction on a new one story plant, 50 x 250 ft., to cost about \$25,000.

The American Forging & Socket Co., Pontiac, Mich., is preparing to build a new foundry, to cost about \$30,000.

The True Mfg. Co., which recently located in Eaton Rapids, Mich., plans to start construction on its new plant within 30 days.

The West Foundry Co., Wyandotte, Mich., expects to have its new foundry in production within the next 30 days. It will specialize in gray iron castings. The capacity of the plant will be about 17 tons daily.

The Hoskins Mfg. Co., Detroit, manufacturer of electric furnaces, etc., has filed plans for a one-story top addition to its plant, 60 x 190 ft. H. B. Walker is president.

The Clark Mfg. Co., Adrian, Mich., manufacturer of separators, etc., is planning to rebuild its factory, recently destroyed by fire with loss of about \$18,000.

Plans for the erection of a new two-story power house are being completed by the Marquette Lumber Co., 1555 Taylor Street, N. W., Grand Rapids, Mich.

The American Accessories Co., Detroit, has been incorporated with a capital of \$25,000 by Lynn C. Beadle and Ernest J. Rousseau, 8772 Quincy Avenue, to manufacture brass and aluminum castings, tools, machine parts, etc.

The Chamber of Commerce, Hillsdale, Mich., is negotiating with the Caskey-Dupree Mfg. Co., Marietta, Ohio, manufacturer of automobile equipment and accessories, relative to the establishment of a local plant.

Baltimore

BALTIMORE, SEPT. 5.

The Bull Dock Lock Washer Co., 269 South Seventh Street, Baltimore, is perfecting plans for its new factory, estimated to cost close to \$50,000, including equipment. G. R. Holmes is president.

Lyon, Conklin & Co., 13 Balderstone Street, Baltimore, manufacturers of sheet metal products, have filed plans for a new one-story plant, 40 x 140 ft.

Oliver B. Rutherford, 104 Dolphin Street, Baltimore, has filed plans for a new three-story plant, 28 x 60 ft., estimated to cost about \$25,000, for the manufacture of automobile radiators and other metal products.

The American Ice Co., Calvert Building, Baltimore, will build a new machine and repair shop, in connection with its new two-story service building for company motor trucks, 35 x 75 ft., at 1314-20 Ridgely Street. Plans have been completed.

The Kelly Mfg. & Sales Co., 2503 West Lexington Street, Baltimore, has leased a building for the establishment of

a new plant to manufacture sleds, coasting cars and other vehicles. A list of equipment is being arranged. The company was recently organized with John I. Kelly as president, and Andrew J. Kelly, vice-president and general manager.

The City Commission, Lynchburg, Va., has commissioned Lamar Lyndon, 21 Park Row, New York, consulting engineer, to prepare plans for its new municipal electric light and power plant. E. A. Beck is city manager.

The Columbia Railway & Navigation Co., Columbia, S. C., has been granted a preliminary permit for the erection of its new hydroelectric generating plant on the Santee and Cooper rivers, estimated to cost approximately \$5,000,000. G. A. Guignard is president.

The Greenwood Petroleum Co., Greenwood, S. C., is planning the erection of a one-story automobile service and repair works for company cars.

Loaders, conveyors, transmission and other machinery will be installed in the new grain elevator to be erected by the Port Commission, Norfolk, Va., plans for which are being prepared. It is estimated to cost in excess of \$700,000. Loading and unloading machinery, hoisting equipment, etc., will also be installed on the pier to be constructed by the commission, to cost more than \$500,000.

The Norfolk & Western Railway Co., Roanoke, Va., will take bids up to Sept. 12, for double coil steel springs, wire rods, wire nails, and parts for electrical apparatus. J. H. Clemmitt is purchasing agent.

The Bristol Granite & Marble Works, Bristol, Va., has awarded a contract to the Stone Lumber Co., Bristol, for a new building, 40 x 100 ft. A traveling crane has been purchased and other equipment will be acquired. John Shirreffs, Box 317, Bristol, Tenn., is general manager in charge.

W. I. Anderson & Co., Greensboro, N. C., have completed plans for the construction of a new cold storage plant, estimated to cost about \$80,000.

The L. Rosenfeld Mfg. Co., Russell and Ostend streets, Baltimore, manufacturer of utensils for dairy and ice cream plants, plans to erect a factory, 40 x 125 ft. Louis Rosenfeld is president.

The Georgia Marble Co., Tate, Ga., will install additional stone-working machinery. H. Litchfield is vice-president.

The Florida Doll Mfg. Co., Monroe Street and Peck Avenue, Fort Myers, Fla., manufacturer of toys, etc., will build an addition and install new machinery.

The Grass Fibre Pulp & Paper Co., Tampa, Fla., is establishing a plant at Leesburg, Fla., for the manufacture of paper pulp, etc. C. F. Logan is consulting engineer.

Pittsburgh

PITTSBURGH, SEPT. 5.

It is doubtful if the local trade ever before experienced a quieter week than the one past. There has been an almost complete absence of inquiries other than those which come out from time to time for estimating purposes. So little is going on that one firm here recently went over the list of projects which had been abandoned or deferred since 1919 and a letter was sent to all, naming current prices on the equipment inquired for. There was only one response to 30 or more letters sent out and this one suggested that if a lower price than quoted was made the company might be interested. Not a crane award has been reported the past week and machine-tool sales have been entirely of individual pieces from dealers' stocks. In manufacturing centers, business is almost at a standstill. It is stated that one Cleveland company has only a dozen men at work when it ordinarily employs hundreds, while another in the same city is said to have more than \$2,000,000 worth of tools in stock.

The Wyckoff Drawn Steel Co., Frick Building, Pittsburgh, has plans under way for an addition to its plant at Wyckoff, Pa., one-story, 60 x 240 ft., and estimated to cost about \$60,000.

The Point Motor Co., 36 Penn Avenue, Pittsburgh, has taken bids for a new three-story service and repair works, 75 x 110 ft., at Penn Avenue and Bell Alley, estimated to cost about \$45,000.

The Moorhead Electric Machinery Co., Pittsburgh, is being organized by William L. Moorhead, Jr., I. R. Moorhead and M. R. Mueller, to manufacture electric equipment, machine parts for electrical apparatus and operate a general repair works. Application for a State charter will be made on Sept. 19. The company is represented by H. J. Rechterwald, 1308 Farmers' Bank Building.

The North Pole Ice Co., Carson Street, Pittsburgh, is having revised plans prepared for its new six-story cold

storage and refrigerating plant, 160 x 190 ft., at 1618 West Carson Street, estimated to cost close to \$500,000 with machinery.

The United Auto Service Co., Pittsburgh, is being organized by Edward, Joseph and I. Harry Goldberg, to manufacture automobile parts and equipment, and operate a general machine works for automotive service. Application for a State charter will be made on Sept. 12. The company is represented by Frank R. S. Kaplan, 922 Frick Building.

The Ford Motor Co., Detroit, has acquired about two acres of land at Huntington, W. Va., as a site for a new assembling plant. Preliminary plans are under way. E. Vernon Carter is local manager.

The Hess Coal & Coke Co., Morgantown, W. Va., will build a new tippie at its plant, with installation of new electrical and mechanical equipment for other departments as recently announced.

The Cheylan Electric, Water & Ice Co., Chelyan, W. Va., is considering the erection of a new ice-manufacturing plant. Ernest E. Coon is secretary and treasurer.

The Motor Transport Co., Huntington, W. Va., is planning for extensions and improvements at its works, to include the installation of a new machine and repair department. W. H. Kincaid is general manager.

Indiana

INDIANAPOLIS, SEPT. 5.

The Pioneer Brass Co., 418 Pennsylvania Street, Indianapolis, will soon call for bids for a new two-story machine shop, 75 x 175 ft., estimated to cost about \$45,000. Charles Brossman, 1503 Merchants Bank Building, is architect.

The Central States Bridge Co., 601 Beecher Street, Indianapolis, has filed plans for a one-story shop extension.

The Knox Engineering & Mfg. Co., Roanoke, Ind., has been incorporated with a capital of 100,000 by A. L. Knox, T. K. Biggs and J. W. Menefee, Roanoke, to manufacture metal products.

The Board of School Trustees, Kendallville, Ind., has completed plans for the erection of its new power house. Improvements will also be made in the present plant.

The Board of County Commissioners, Indianapolis, will take bids until Sept. 27 for extensions and improvements in the power house at the county jail. C. S. Bark, 159 East Market Street, is architect.

Preliminary to the construction of a new plant at Torreon, Mex., for the manufacture of automobiles, the Frontenac Co., Indianapolis, is building a number of model automobiles at its plant for the Compania Automobiles Anahuac de Mexico, headed by A. P. Buquor, vice-president and general manager, and J. A. Carvel, secretary, both of El Paso, Tex. It is proposed to commence construction of the Torreon plant at an early date and have the works ready for operation shortly after the first of the year. The Frontenac Co. will manufacture parts and other equipment for the new cars.

Milwaukee

MILWAUKEE, SEPT. 5.

* A gradual increase in the number of inquiries and the broader scope of their origin are the two most important developments in machine tool trade in this section. It is not so difficult to get inquiry to the stage of closing sales as it was for several months past, although it generally requires concessions to make deals. Buyers are still doing an unusual amount of shopping, and spreading a single inquiry over a relatively larger number of sellers probably gives an aspect of more activity than really exists. The time is not yet at hand when large lot buying is in prospect. Business remains limited largely to single orders for replacement or piecing out equipment. In a few shops production has made a slight advance with the recent reduction of stocks of standard machines and orders for special specifications.

The Oshkosh Tractor Co., Oshkosh, Wis., which has acquired the entire business of the LaCrosse, Wis., Tractor Co., has purchased eight acres on Harrison Street, between the main lines of the Chicago & Northwestern and Soo Line railroads, and expects to award contracts within 10 days for the construction of its new plant. Auler & Jensen, local architects, have completed plans for a main building, 150 x 300 ft., of brick and steel, with sawtooth roof of six bays, each 25 ft. wide, with a wing, 25 x 100 ft., as a motor testing room. Provision also is made for a separate power plant 60 ft. sq., and a detached office building, 40 x 80 ft., two stories. The equipment and materials at LaCrosse are

now being prepared for shipment to Oshkosh. In addition to this machinery, the company will be in the market for a considerable list of miscellaneous tools and other equipment. L. W. Melcher, factory manager at LaCrosse, will occupy the same position with the new concern.

The Safety First Automatic Signal Co., Racine, Wis., has been organized with a capital of 1,000 shares of common stock without par value, by C. C. Mortenson, A. J. Riggs and F. G. Haidle, to manufacture signal devices. A plant will be equipped in leased quarters.

The Prime Mfg. Co., 97 Wisconsin Street, Milwaukee, will build a two-story addition, 40 x 50 ft., to its main plant at 653-657 Clinton Street, to accommodate the administration department, now in separate quarters. Part of the building will also be used for laboratory purposes. The Prime company manufactures railroad supplies and brass castings. Orton L. Prime is president and general manager.

The Twin Ports Steel & Tractor Co., Superior, Wis., has changed its name to the Twin Ports Steel & Machinery Co. For some time past the manufacture of tractors has given way largely to the production of general machinery and repairs and the new title is adopted to better express the nature of its business.

George Erlinger & Co., Milwaukee, have been organized in Wisconsin with capital stock of \$200,000 to succeed to the business of manufacturing mechanical specialties conducted by George Erlinger at 191-194 Milwaukee Street. The new company intends to enlarge the scope of the business to embrace the manufacture of machinery, tools and similar specialties in addition to tools, dies, jigs, fixtures, etc.

The Board of Education, Prairie du Sac, Wis., has let the general contract to Willis & Deason, Janesville, Wis., for an addition to the high school to be equipped for manual training and general vocational instruction. It will cost about \$75,000. The equipment will be purchased in about 60 days.

The Drop Head Projector Co., Fond du Lac, Wis., manufacturer of portable motion picture machines, has increased its capitalization to \$750,000, consisting of \$700,000 common and \$50,000 preferred stock. The company has been reorganized and is preparing to engage in quantity production. The contract for dies and die castings has been placed with the Doehler Die Casting Co., Chicago and Toledo.

The Board of Education, Valders, Manitowoc county, Wis., has placed the general contract for a new high school, with manual training facilities, with Hugo V. Hertling, Inc., general contractor, Manitowoc. The project involves about 125,000.

The Klechkefer Box Co., Milwaukee, and a member of smaller allied concerns manufacturing wooden, wirebound, fibre and composition boxes and other packages, have been reorganized into the Klechkefer Container Co., capitalized at \$1,315,000. The main plant is at Sixteenth and Canal streets. John W. Klechkefer is president and general manager.

The Gulf States

BIRMINGHAM, SEPT. 5.

The Chicago, Rock Island & Pacific Railroad Co., 137 West Van Buren Street, Chicago, has awarded a contract to J. E. Nelson, 3240 South Michigan Avenue, for a new engine house and repair shop at Amarillo, Tex., estimated to cost about \$50,000.

The Pitts-Noyes Co., 112 East Fifth Street, Austin, Tex., recently organized to manufacture tools, dies, etc., has acquired a local building and plans for the immediate installation of lathes, grinders, presses, and other machine tools. C. K. Noyes, secretary and treasurer, is in charge.

Potter Johnson, Crystal Springs, Miss., has plans under way for a new two-story foundry and machine shop.

Fire, Aug. 23, destroyed the plant of the Flake Graphite Corporation, Goodwater, Tex., with loss estimated at about \$500,000, including refining mill, machinery, etc. Plans are under way for the immediate rebuilding of the plant.

The Planters' & Merchants' Mills Co., 200 East Fortieth Street, Austin, Tex., S. M. Ransopher, president, has preliminary plans under way for a new hydroelectric generating plant on the Guadalupe River, estimated to cost about \$700,000.

Fire, Aug. 23, destroyed the power house of the Kyle Light & Power Co., Kyle, Tex. It will be rebuilt.

Reed Bingham, Pensacola, Fla., has been granted a permit for the construction of a new hydroelectric generating

plant on the Perdido River. A branch power station is also planned on the Blackwater River. Work will be placed under way at an early date.

The A. & J. Stove Foundry, Gadsden, Ala., will soon resume operations at its plant, following a shut-down for about 24 months, and has tentative plans under way for the erection of additions.

The Burns Building Board Co., Box 1643, Tampa, Fla., recently organized, has plans under way for its proposed plant to manufacture wall board products. Joseph J. Burns is president and manager.

The National Compress Co., Waco, Tex., is planning to rebuild its cotton compressing plant at Brady, Tex., recently destroyed by fire. The new plant will cost about \$125,000 with machinery. R. D. McCaskill is manager.

The McCullough Service & Mfg. Co., Tampa, Fla., recently incorporated, will operate a plant for the manufacture of automobile parts, with service and repair departments. F. L. McCullough is president, and M. G. Gibbons, treasurer.

California

SAN FRANCISCO, AUG. 31.

The past week or ten days have witnessed a considerable revival in the demand for machinery on the coast. While buying is largely confined to the smaller and low priced tools, the volume of business is said to be greater than that which has been prevailing for the last two or three months. There is still much Government and second-hand machine tools available which continue to attract the greatest attention.

The Shell Oil Co., Signal Hill, Long Beach, Cal., has filed plans for the erection of a machine shop, 52 x 75 ft.; forge shop, 52 x 60 ft.; general works building, 76 x 90 ft.; and service building for company trucks, 44 x 130 ft.

The Miller Auto Electric Mfg. Co. Los Angeles, has been incorporated with a capital of \$100,000 by Robert C. Camp, Sidney G. Miller and J. F. O. Nelson, to manufacture electrical products. It is represented by L. T. Mayhew, 338 Byrne Building.

The Excelsior Water & Mining Co., Sacramento, Cal., is planning the construction of six hydroelectric generating plants to develop about 115,000-hp.

A one-story machine shop, 36 x 40 ft., will be constructed by the Golden State Woolen Mills, Long Beach, Cal., in connection with rebuilding its plant, recently destroyed by fire with loss of about 200,000.

The J. & M. Brick Co., 503 Boundary Avenue, Los Angeles, has filed notice of organization to manufacture bricks, tiles and kindred products. It is headed by D. B. Jefferies, 1818 West Forty-ninth Street, and E. K. Muller, 422 Cypress Avenue.

G. S. Eyre, Buena Vista, Cal., and associates are planning the construction of a new hydroelectric generating plant on Chalk Creek.

The Arro Plane Co., Scottdale, Cal., has been incorporated with a capital of \$500,000 by O. K. Jeffery, John A. Hesse and J. D. Hill, to manufacture airplanes and parts.

The Great Basin Power Co., Walker Bank Building, Salt Lake City, Utah, has plans under way for a new hydroelectric generating plant in the vicinity of Stockmore, Utah, with initial capacity of about 10,000-kw. H. A. Srauss, company address, is engineer.

The Central South

ST. LOUIS, SEPT. 5.

The Unico Motor Products Co., 1229 West Fifty-ninth Street, Kansas City, Mo., has plans nearing completion for two one-story buildings, 60 x 224 ft. and 60 x 160 ft., respectively. The first will be equipped as a machine works for the manufacture of pistons, piston rings, etc., and the other will be used as a foundry. W. R. Alexander is head.

The Common Council, St. Charles, Mo., has commissioned Benham & Mullergren, consulting engineers, Firestone Building, Kansas City, Mo., to prepare plans for the proposed municipal electric power plant, estimated to cost about \$200,000.

The Wichita Visible Pump Co., 701 Gilbert Street, Wichita, Kan., E. P. Hayes, head, manufacturer of pumping equipment, parts, etc., is planning for the erection of a new factory, estimated to cost about \$60,000.

The Norton Iron Works, Ashland, Ky., is considering preliminary plans for a one-story addition to manufacture wire-fencing. T. M. Adams is president.

The Eagle Motor Truck Co., 6154 Bartmer Avenue, St. Louis, has awarded a contract to Rodinan & Son, 6063 Clemons Avenue, for the superstructure of its new one-story plant on Bartmer Avenue, 50 x 150 ft., estimated to cost \$50,000. J. P. Reis is head.

The Producers' & Refiners' Corporation, Tulsa, Okla., has plans under way for the construction of a new oil refinery on a local site.

Fire, Aug. 23, destroyed the machine shops at the automobile works of Christian & Brough, Vicksburg, Miss., with loss estimated at about \$65,000. It will be rebuilt.

The Charitan Coal & Coke Co., Marceline, Mo., is planning the construction of a new steel tippie.

The Clarence Automobile Co., Clarence, Mo., is having plans prepared for a new one-story machine and repair works, 100 x 140 ft., estimated to cost about \$50,000, including machinery. Burgher Brothers, Hannibal, Mo., are architects. A. Burnett is head.

The Kingston Ice & Light Co., Kingston, Okla., is planning to rebuild the portion of its plant, recently destroyed by fire with loss of about \$25,000.

The Lexington Utilities Co., Lexington, Ky., has completed plans for a one-story addition to its power plant. The company recently issued bonds for \$560,000 for expansion.

W. B. Collins, Ketchum, Okla., and associates, are organizing a company with capital of \$2,000,000 for the construction of a hydroelectric generating plant on the Grand River, estimated to cost about \$1,000,000. Byron Kirkpatrick, Tulsa, Okla., is interested.

The Twentieth Century Piston Ring Co., St. Louis, has leased the building at Eighteenth Street and Cass Avenue, which will be remodeled for the manufacture of piston rings.

Canada

TORONTO, SEPT. 5.

With the passing of summer the Canadian machine tool market is expected to show improvement and dealers look for a better demand for equipment within the next few weeks. A number of tool makers have excellent exhibits at the Canadian National Exhibition, now being held in Toronto, and are making the most of the opportunity to show new and special lines of equipment and from the interest taken by the general public it would appear that better times are not far ahead. At present very little is being done in the way of building new plants or additions, and although a number of concerns are in need of equipment for replacement purposes, purchases are being held up until more favorable conditions arise. Municipal and provincial governments continue to buy for public works and this is holding up the demand for this particular line of equipment.

The general contract for the construction of an electric pumping station for Montreal has been placed with the Atlas Construction Co., Ltd., 37 Belmont Street. The city will shortly call for bids for three electric pumps of 30,000,000 gal. capacity; also electric apparatus, transformers, etc.

W. C. Durant, founder of General Motors, Ltd., in Canada, has purchased the property and buildings of the Leaside Munitions Co., Leaside, Toronto, and will install equipment for the manufacture of Durant automobiles. Plans call for a capacity of 100 finished cars a day and it is proposed to manufacture in the Dominion every important part of the car, including electrical equipment and tires. A wood-working plant will be erected for the manufacture of car bodies. The main building on the site, 130 x 640 ft., will be used as a machine shop, where all motors, axles and transmissions will be made. The building program also calls for the construction of a three-story assembling plant, 130 x 160 ft. It is expected to have the works in full operation by next March.

The Wingham Wire Co., Ltd., Hamilton, Ont., has been incorporated with a capital stock of \$250,000 by James Chisholm, Thomas B. McQuesten, William G. Welby and others to manufacture wire, wire rope, cables, etc.

Dodge Brothers, Detroit, Mich., have purchased 35 acres in the town of Sandwich, Ont., where they intend to erect an assembling plant to take care of Canadian and British export trade.

NEW TRADE PUBLICATIONS

Gears.—Boston Gear Works, Norfolk Downs, Quincy, Mass. Second edition 1921 catalog. Outlines in full the entire line of gears, bearings and other material carried in stock, listing also material and new sizes not included in previous catalogs. Size $3\frac{1}{4} \times 5\frac{1}{2}$ in., 112 pages.

Conveying Machinery.—Freeman-Riff Co., Terre Haute, Ind. Bulletin No. 210. Describes the F-R, Type A, portable flight conveyor. The illustrations include line drawings of the conveyor arranged for unloading coal from car to storage shed and mounted on truck for loading coal from shed into wagons.

Crane Booms.—Pawling & Harnischfeger Co., Milwaukee, Wis. Pamphlet TX. Describes the new skimmer scoop attachment for use with the company's type 205 and 206 excavator cranes. Data and operating cost on a road grading job are given.

Air Compressors.—Bury Compressor Co., Erie, Pa. Bulletin No. 407. Size $8\frac{1}{4} \times 11$ in., 20 pages. Describes the Bury direct-connected, two-stage, three-cylinder, variable-volume, motor-driven, air compressor. Contains also an abridged general catalog supplement illustrating Bury single-stage, power driven machines; two-stage, duplex power driven and vacuum pumps of various classes. Illustrations and a list of users of the Bury patented Pyramid box-plate valve is included.

Electric Furnaces.—Westinghouse Electric & Mfg. Co., electric furnaces which recently have been added to the list of products of the company, described and illustrated in catalog 9-C, just issued. This type of furnace includes the multiple unit designed for use with heats of 1800 to 2000 deg. Fahr. The small hevi-duty furnaces of the multiple crucible type may be operated continuously at 2000 deg. Fahr. Hevi-duty industrial furnaces with applications for annealing, hardening, drawing and enameling, are described in detail. A discussion of the characteristics of these furnaces also is given.

Oil Circuit Breakers.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., treats the application of oil circuit breakers in a 20-page pamphlet known as Special Publication 1643. This includes a complete discussion of the application of circuit breakers, together with an outline of the characteristics of several types of Westinghouse breakers.

Wiring Tables and Illumination Data.—Booklet issued by George Cutter Works, Westinghouse Electric & Mfg. Co., South Bend, Ind., contains much interesting data on wiring and lighting offices, factories, etc. Tables of foot candle intensities recommended for different classes of service, are included in this booklet, and an interesting discussion of lighting installations is given. Several new devices manufactured by the Westinghouse company are shown in the booklet.

Electric Tramrail Equipment.—Cleveland Crane & Engineering Co., Wickliffe, Ohio. Catalog No. 2. Photographs are shown of tramrail systems installed in brass foundries for various operations including the handling of molten metal, for warehouse use, coal handling, handling work in a machine shop and for use in garages and rubber plants. The system is designed for hoisting and conveying loads up to 2 tons. The line of equipment includes hand carriers of various capacities down to a maximum of 125 lb., electric carriers with or without hoists, electric hoists with hand travel, and electric carriers with hoists and platforms or open or enclosed cabs. Tramrail cranes and transfer bridges are also included in the line as well as various tramrail handling attachments and a tramrail scale.

Pneumatic Tool Accessories.—Ingersoll-Rand Co., 11 Broadway, New York, Form No. 8017, 24 pages. Illustrates and describes complete line of Little David pneumatic tool accessories, including air hose, hose couplings, hose clamp and menders, air drill chucks, rivet sets and blanks, rivet set clips and other equipment. Tables of dimensions of all rivet sets and chisels are given.

Small Tools.—Greenfield Tap and Die Corporation, Greenfield, Mass., catalogue No. 46, superseding Nos. 40 and 42, and Lincoln Twist Drill Co., catalogue Nos. 10 and 10-C. Size, 400 pages $5 \times 7\frac{1}{2}$ in. Comprehensive catalogue describing the small tools and pipe tools comprising the greater part of the company's product. The tools include screw plates, taps, dies, drills, reamers, milling cutters, bits, arbors, countersinks, hobs, tap and drill kits, mandrels, sleeves, sockets, stocks, tap wrenches, pipe vises and pipe wrenches. More than 70 pages of tables and other information is given for the user and designer of tools and machinery.

Oil Burners.—F. J. Ryan & Co., Philadelphia. Bulletin 1A. Describes the Mirco Universal Burner. Illustrations in-

clude a diagrammatic photograph of the burner, and various furnace applications. Size 8×11 in., 4 pages.

Rivet Heating Furnace.—F. J. Ryan & Co., Philadelphia. Bulletin 2 A. Devoted to the Mirco oil-fired, portable rivet heating furnace.

Portable Air Hoist.—The Denver Rock Drill Mfg. Co., Denver, Colo. Booklet 6×9 in., 16 pages, describing in detail the Waughoist, model 250. The illustrations include the hoist in use in mining operations, in foundry work, in loading freight and in other operations. Sectional views of the mechanism are given. The general specifications mention the hoisting capacity as 500 to 2000 lb. at 100-lb. air pressure at vertical speed of 68 to 143 ft. per min., depending on the load.

Coal Washeries and Handling Plants.—Simon-Carves, Ltd., Manchester, England. Booklet 9×11 in., 56 pages. Describes and illustrates the British Baum coal washing plant, giving sectional drawings and plans of the 150 ton per hour illustration at the Penalta Colliery. Several full page photographic reproductions of installations are also given. Coal handling, crushing and storage plants, with illustrations of the units and of various installations are included. A list of installations and maps of the coalfields of England and Scotland conclude the booklet.

New Books Received

The Management of Men. By Edward L. Munson. Pages xiii + 801; $5\frac{1}{4} \times 8\frac{1}{2}$ in. Published by Henry Holt & Co., 19 West Forty-fourth Street, New York.

Transactions of the American Institute of Chemical Engineers, Vol. XIII, Part 1, 1920. Pages iv + 463; 6×9 in. Published by the Institute and for sale by D. Van Nostrand Co., 8 Warren Street, New York.

Official Proceedings of the Eighth National Foreign Trade Convention Held at Cleveland, Ohio, May 4-7, 1921. Pages 600, 6×9 in. A stenographic report of the proceedings and the discussions at the 11 group sessions and the addresses at the general sessions. Issued by the secretary, India House, Hanover Square, New York.

Statistical Abstract of the United States, 1920 (Forty-third Number). Pages xix + 874, $5\frac{3}{4} \times 9$ in. Sold only by the Superintendent of Documents, Government Printing Office, Washington, D. C.

The Working of Steel. By Fred H. Colvin and K. A. Juthe. Pages 244, 6×9 in.; 123 illustrations. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

The Metallurgy of the Common Metals. By Leonard S. Austin. Pages xvii + 615, 6×9 in.; 326 illustrations. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York.

Text Book of Mathematics. By Esselborn. In two volumes. Pages, Vol. I, 643; Vol. II, 770; $7\frac{1}{2} \times 10\frac{1}{2}$ in.; illustrations, 1578. Published by William Engelmann, Leipzig, Germany. Written in German.

The Ideal Electric & Mfg. Co., Mansfield, Ohio, has just issued a complete technical bulletin on "Synchronous Motors for Power and Power Factor Correction." All technical articles, data and descriptions were written and compiled by the chief engineer of the company, Theodore Schou. The company has also completed a bulletin on elevator motors. Both bulletins may be had for the asking.

The *Boletin de Obras Publicas*, Florida 32, Buenos Aires, one of the leading engineering periodicals in Argentina, maintains a free information service for its 6,800 subscribers, most of whom are engineers and contractors. It has been suggested that the American manufacturers of building materials, construction machinery and railroad equipment send catalogs of this class of material to the office of the publication mentioned, to be placed at the disposal of subscribers.

Practical applications of the electric arc welding process is to be discussed by E. Wanamaker, Chicago, Rock Island & Pacific Railroad, at a meeting of the Metropolitan Section of the American Welding Society to be held on Tuesday, Sept. 20, in the Engineering Societies Building, New York.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price.....	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price.....	2.78c.
Hoops, base price.....	3.88c.
Bands, base price.....	3.43c.
Beams and channels, angles and tees	
3 in. x ¼ in. and larger, base.....	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger.....	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger).....	2.95c.
Toe calk, ½ x ¾ in. and larger.....	3.45c.
Cold-rolled strip, soft and quarter hard.....	10.00c. to 10.50c.
Open-hearth spring steel.....	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex.....	4.98c. to 5.03c.
Standard cast steel, base price.....	14.00c.
Extra cast steel.....	17.00c.
Special cast steel.....	22.00c.

Tank Plates—Steel

¼ in. and heavier.....	2.88c.
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Sheets

Blue Annealed	Per Lb.
No. 10	3.28c.
No. 12	3.33c.
No. 14	3.38c.
No. 16	3.48c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20.....	3.80c. to 4.05c.	.....
Nos. 22 and 24.....	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....
No. 28, 36 in. wide, 10c. higher.		

Galvanized

	Per Lb.
No. 14	4.10c.
No. 16	4.25c.
Nos. 18 and 20	4.40c.
Nos. 22 and 24	4.55c.
No. 26	4.70c.
No. 27	4.85c.
No. 28	5.00c.
No. 30	5.50c.
No. 28, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel	Wrought Iron
Blk. Galv.	Blk. Galv.
½ in. Butt.. —48 —32	¾ in. Butt.... —22 —4
¾ in. Butt.. —54 —39	1-1½ in. Butt. —24 —6
1-3 in. Butt.. —56 —42	2 in. Lap..... —14 —1
3½-6 in. Lap. —51 —37	2½-6 in. Lap. —22 —6
7-12 in. Lap.. —43 —27	7-12 in. Lap.. —7 +4

Steel Wire

	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¼c. to 18¼c.
High brass wire	16¼c. to 21¼c.
Brass rod	13¼c. to 20¼c.
Brass tube, brazed	26½c. to 31 c.
Brass tube, seamless	18 c. to 20 c.
Copper tube, seamless.....	19½c. to 22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade	Grade	Coke—14-20	Primes	Wasters
	"AAA"	"A"			
	Charcoal	Charcoal			
	14x20	14x20			
	IC..	\$10.60	\$9.50	80 lb...\$6.80	\$6.55
	IX..	11.80	10.75	90 lb... 6.90	6.65
	IXX..	13.60	12.25	100 lb... 7.00	6.75
	IXXX..	15.60	14.25	IC... 7.20	6.95
	IXXXX..	17.20	16.00	IX... 8.10	7.85
				IXX... 9.10	8.85
				IXXX... 10.50	10.25
				IXXXX... 11.50	11.25

Terne Plates

8-lb Coating 14 x 20

100 lb.	\$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	36c. to 37c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks.....	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6½c.
Solder, ½ and ⅓ guaranteed.....	20¼c.
No. 1 solder	18½c.
Refined solder	15½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.....	80c.
Commercial grade, per lb.....	40c.
Grade D, per lb.....	35c.

Antimony

Asiatic	6c. to 6½c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....	29c. to 31c.
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Old Metals

The market is very quiet with no business. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.50
Copper, heavy and wire	8.75
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

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6.95
7.85
8.85
0.25
1.25

7.50
7.75
8.00
1.00

30c.
37c.

15c.
15c.
15c.

$\frac{1}{4}$ c.
12c.

$\frac{1}{2}$ c.
 $\frac{3}{4}$ c.
 $\frac{1}{4}$ c.
 $\frac{1}{2}$ c.
 $\frac{3}{4}$ c.

cord-

80c.
40c.
35c.

$\frac{1}{2}$ c.

31c.

lers'

cents
r lb.
9.50
8.75
7.50
4.50
3.75
7.50
4.00
6.25
3.50
2.00
2.50